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Technical Basis for Maneuvering Performance Standards

Hydronautics, Incorporated

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16. Abstract

The development of a set of maneuvering performance standards applicable to ocean-going and Great Lakes ships larger than 1000 metric tons (deadweight) is described. These standards, which are considered suitable for immediate use for rating ship maneuvering performance, are based on relative performance (superior through marginal) of the majority of ships, rather than an absolute (go/no go) rating. The ratings are based on available full scale (builder's trials) data for more than 600 ships of various types. The ratings were determined from a straight forward analysis. The recommended rating system includes: a turning index, an overshoot angle index, a responsiveness index, and a stopping index; the trials agenda to obtain the indices is provided.

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NOMENCLATURE

A	Advance in turn in meters
A_R	Total rudder area in square meters
A_s	Submerged profile area in meters squared
A_W	Above water (windage) profile area in meters squared
A'	Non-dimensional advance - $\frac{A\,\delta_r}{35\,LBP}$
B	Ship beam in meters
C_B	Block coefficient
D_T	Tactical diameter in meters
D_P	Propeller diameter in meters
D'	Non-dimensional tactical diameter - $\frac{D_T\,\delta_r}{35\,LBP}$
F	Froude number - $V/\sqrt{g\,LBP}$
g	Gravitational acceleration - 9.80665 meters per second square
HP_a	Maximum astern horsepower
K'	Nomoto-Norrbin zig-zag parameter
K^*	$1/K'$
L	Ship length in meters
LBP	Length between perpendiculars in meters
R_h	Head Reach in meters
R'	Non-dimensional value of $R_h = \frac{R_h}{LBP} \times \frac{1}{F}$
t	Time in seconds
t_s	Time to stop in seconds
T	Ship draft in meters
T_T	Transfer in turn in meters
T'	Nomoto-Norrbin zig-zag parameter
T^*	$1/T'$

V	Velocity in meters per second
V_a, V_o	Initial or approach velocity in meters per second
V_{ship}	Ship velocity in meters per second
V_{wind}	Wind velocity in meters per second
δ_r	Rudder angle in degrees
δ_1	First overshoot angle in degrees
δ_2	Final overshoot angle in degrees
δ'	Non-dimensional overshoot angle $= \frac{\delta}{\delta_r}$
Δ	Ship displacement in metric tons
ρ	Mass density of seawater - 104 kilogram-meters square per second fourth
σ	Standard deviation or RMS value

Subscripts

D	Tactical diameter
m	Mean value
R	Head reach
δ	Overshoot angle

Definitions:

RMS or Root Mean Square Value - The standard deviation of a set of data, equal to the square root of the summation of the squares of the difference between the value of each data point and the mean value of the set.

Mean Value - The average value of all data or, for a straight line curve fit, the local value of the straight line having the smallest RMS value (least squares curve).

Least Squares Fit - The curve, of specified type or order, which yields the smallest RMS value for all data points in a given set.

EXECUTIVE SUMMARY

This report describes the development of maneuvering performance standards for commercial vessels larger than 1000 metric tons displacement, intended for normal cargo or passenger operations. These standards are designed to provide a means for rating controllability under conditions where collisions, rammings and groundings (CRGs) are likely to occur. This work has been carried out for the U.S. Coast Guard by HYDRONAUTICS, Incorporated under Department of Transportation Contract DTCG23-80-C-20037.

This development was carried out in seven tasks which were to:

1. Collect available trials data and incorporate in a maneuvering data base.
2. Analyze trials data to determine statistics of maneuvering performance.
3. Conduct maneuvering simulations on ships for which maneuvering qualities were known, to determine behavior in standard maneuvers.
4. Determine the effect of wind on ship controllability.
5. Consider the effect of machinery on controllability.
6. Determine if a correlation between frequency of casualties and maneuvering performance can be established.
7. Establish, based on results of Tasks 2-6 above, proposed maneuvering performance standards.

Motivation for this Study

This study was motivated by a long term awareness of the need for maneuvering performance standards and the requirement that the Coast Guard provide rules and regulations governing ship safety and pollution control. In particular, the Coast Guard has been charged to:

> "Begin publication as soon as practicable of proposed rules and regulations setting forth minimum standards of design, construction, alteration, and repair of vessels .... such rules and regulations shall, to the extent possible, include but not be limited to improved vessel maneuvering and stopping ability and otherwise reduce the possibility of collisions, grounding or other accident ..." (emphasis added)

Background

At present there are no standards or requirements for ship maneuvering and stopping performance. There are a number of reasons for this: most ships have traditionally had at least acceptable maneuvering performance; human operators, who are highly adaptable, can compensate, at least in part, for poor ship capability; and owners have not had a clear economic incentive for improving maneuvering performance. Any meaningful standards must take these factors into account, and rigid (go/no go) or inflexible standards will not be accepted and applied.

Successful standards must provide a more flexible approacn which is based on some type of performance ratings and is generally acceptable to industry and which reflects inherent ship controllability under restricted water conditions typical of those under which most ship maneuvering and most CRG casualties occur. The standards developed in this study and discussed in this report attempt to meet these goals.

Approach to Developing Standards

The approach selected in this study involves a three level process in which available data have been used to establish:

- "Criteria" which could be used as a basis for selecting specific measures of performance.
- "Measures" of performance which would provide a basis for selecting quantitative performance levels.
- "Levels" of performance which would represent specific quantitative definitions of performance, i.e., superior performance, average performance, etc.

In establishing the proposed maneuvering performance standards, measures and levels of performance, several separate approaches have been followed, including:

- An analysis of ship casualty data to see what correlation could be established between ship maneuvering performance and maneuvering related casualties.

- Collection and analysis of a large enough body of ship trials data to rate ship maneuvering performance primarily on the basis of ship's performance in selected trials maneuvers.
- Simulations of the effect of ship aerodynamic characteristics on the ability of a ship to maintain course and/or execute a desired maneuver.

Nature of Standards

Performance standards were developed based on the following assumptions: (1) all vessels must have the inherent maneuvering capability to allow them to be navigated from Point A to Point B; (2) the greatest demands on maneuvering performance occur in restricted waters and all vessels must be able to initiate and check a turn, maintain course, stop, operate at moderate speeds and not be overly sensitive to the environment, particularly wind; (3) standards should be intended to cover normal operating conditions and to provide a ranking of performance relative to other vessels of a similar size and type. Measures of maneuvering performance should reflect the following critieria:

- The measure should be directly related to the type of performance being rated, i.e., head reach is a good measure of stopping ability,
- The measures should be ones which can be based on available data for existing ships since the rankings are relative,
- The performance in a given measure should be able to be determined from trials,
- There should not be a significant increase in the complexity or time required for trials needed to establish performance standards,
- The measures should reflect the effects of environment, and particularly wind,on maneuvering performance.

For each measure considered, quantitative levels of performance must be established. For the present standards, five levels of performance have been used. These are: superior; above average; average; below average; and marginal. These levels have been established based on the following:

- Performance levels which are known, on the basis of operating experience or simulation studies, to increase or reduce casualty risk.
- Performance levels that significantly differ from those of other vessels of similar size and type, i.e., performance which a pilot would not expect.
- Performance levels of vessels identified by pilots as "problem vessels" or "superior vessels".
- Performance levels of vessels with a large number of casualties.

This report discusses, in detail, the technical basis for establishing such levels of performance.

Proposed Standards

A set of proposed standards and trials agenda have been established. These standards are based on ratings in each of the following areas:

- Turning and Coursekeeping -
  1. The tactical diameter/length ratio for a full rudder angle turn at full maneuvering speed. (eight to 10 knots)
  2. The overshoot angle from a 20-20 zig-zag maneuver performed at full maneuvering speed.
  3. The K'-T' relationship from a 20-20 zig-zag maneuver performed at full maneuvering speed.
- Stopping -
  4. The head reach/length ratio of a crash stopping maneuver from a steady initial reduced maneuvering speed of eight knots.
- Ability to Operate at Moderate Speed -
  5. The ability to operate continuously at a speed between four and six knots for all ship load conditions.
- For Operation Under Severe Environment -
  6. The ability to operate at any heading to the wind at some representative severe wind condition.

Levels of performance in the first four areas are defined, from performance in standard trials, using Figures 28-31 of the text. If the ship is unable to meet the conditions of either item 5 or 6 the ship receives a marginal rating in the area, otherwise it receives no rating in these areas. The overall ship rating is taken to be the lowest of the ratings in these individual areas.

In addition, for vessels meeting one of the following criteria, acceptable maneuvering performance shall be demonstrated to United States Coast Guard satisfaction during the "design phase" by means of special investigations. These criteria are:

- The ratio of above water profile area to below water profile area exceeds three in the minimum operating draft condition.
- No rudders are located in the slip stream of a propeller.
- Propeller direction of rotation (or direction of propeller thrust) cannot be changed at least four times in one minute.

At present sufficient data are not available to establish numerical values for the last criterion and additional data need to be collected.

Proposed and Alternative Trials Agenda

The trials maneuvers to be carried out to determine ship performance ratings are:

- Turning maneuver from full maneuvering speed with maximum rudder angle.
- 20-20 zig-zag maneuvers from full maneuvering speed.
- Crash stopping maneuvers from reduced maneuvering speed.
- Demonstration of ability to operate at a continuous speed between four and six knots.

Based on present understanding, two additional maneuvers are considered highly desirable and are strongly recommended, but not required:

- Coasting zig-zag in which the propeller is stopped at the initiation of the maneuver.
- Standing turn in which the propeller is started and the rudder is put over simultaneously, with the ship at zero speed.

The performance measures for these maneuvers are the same as those for the standard zig-zag and turn. It would be highly desirable to include performance measures from one or both of these measures in future standards.

It is proposed to conduct all trials maneuvers at a "maneuvering" speed rather than ship design speed. It may be desirable for other reasons, to conduct supplement trials for some or all maneuvers at or near design speed, when feasible. If such trials are conducted, the same measures of performance should be determined and compared with "maneuvering" speed values to determine speed sensitivity, but should not be used to determine ship performance ratings.

Conclusions and Recommendations

The conclusions of this study are reflected in the proposed standards and trials agenda. The most significant conclusions include:

1. It is not feasible or desirable to establish absolute performance standards in which some ships are rated unacceptable.
2. It was possible to rely heavily on a straightforward statistical analysis of the extensive body of collected trials data in formulating the proposed standards.
3. Ship performance in normal turns, crash stops and zig-zag maneuvers are all important for rating performance.
4. Large differences in maneuvering performance between different ship and machinery types exist in some areas.
5. If an overall ship performance rating is needed it should be based on the lowest of the individual ratings rather than an average rating.
6. Trials used to determine maneuvering performance ratings should be conducted at a typical maneuvering speed rather than ship design speed.
7. While some further refinements are needed, the proposed standards presented in this report are considered suitable for immediate use in rating ship maneuvering performance.

Recommendations for additional work include the need to identify ships which have unusually good or bad maneuvering performance, to determine the performance in trials maneuvers of ships having large number of maneuvering related CRG casualties and to conduct additional man-in-the-loop simulations studies. Much of this work is currently under way or planned.

1.0 INTRODUCTION

1.1 Purpose of this Study

This report describes a study to develop a set or system of maneuvering performance standards which can be used to rate the maneuvering performance of any commercial oceangoing or Great Lakes vessel over 1000 metric tons* intended for the normal transport of cargo or passengers. These standards are designed to provide a means for rating the controllability of a ship under conditions where casualties of the collision, ramming and grounding (CRG) type are most likely to occur. The need for such standards is discussed in the next section.

This work has been carried out for the U.S. Coast Guard by HYDRONAUTICS, Incorporated under Department of Transportation Contract DTCG23-80-C-20037.

1.2 Motivation for this Study

The U.S. Coast Guard has been charged, by "The Presidential Initiative to Reduce Maritime Oil Pollution of March 1977," as described by Card, et al (1979) to:

> "....undertake several studies of other promising programs and techniques for reducing marine oil pollution. These studies will include: ..... an evaluation of devices to improve maneuvering and stopping ability of barge tankers ..."

The Coast Guard has been previously charged, by the Ports and Waterways Safety Act (PL 92-340) and the later Port and Tanker Safety Act of 1978 (PL 95-474), to:

> "begin publication as soon as practicable of proposed rules and regularions setting forth minimum standards of design, construction, alteration, and repair of the vessels .... such rules and regulations shall, to the extent possible, include but not be limited to improved vessel maneuvering and stopping ability and otherwise reduce the possibility of collisions, grounding or other accident ...." (emphasis added).

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* This minimum vessel size was selected as a reasonable boundary between small vessels such as fishing vessels and harbor bessels, and larger vessels for which safety considerations are more acute.

As described by Card, et al (1979), the Coast Guard has not proposed rules in this area because it feels that such rules did not appear justified. Rather, the Coast Guard proposed and has begun implementation of the following action:

> "The Coast Guard has initiated a regulatory project to require the maneuvering and stopping capabilities of new tankers to be addressed in the design process and measured after construction. *This requirement will most likely take the form of maneuvering performance standards based on definitive maneuvers to be verified by full scale trials.* An Advance Notice of Proposed Rulemaking (ANPRM) will be published to solicit a wide range of comments and ideas for implementing the action. Existing tankers will be evaluated using the standards developed. Further action for existing tankships will be based on that evaluation. The Coast Guard will also pursue this action internationally at the Inter-Governmental Maritime Consultative Organization (IMCO), where the Ship Design and Equipment Subcommittee is currently dealing with maneuverability of tank vessels as an item of high priority." (Italics added)

Such an ANPRM has been issued (Cojeen and Mervin, (1981). The form of the maneuvering performance standards given in the ANPRM reflects to some extent the approach selected in this study and described in this Report.

There are a number of alternatives available in the development of maneuvering performance standards, as discussed in the ANPRM. They include:

- Establish no standards (do nothing!)
- Provide guidance on maneuvering performance of vessels
- Establish regulations for tankers and provide guidance for other vessel maneuvering performance
- Establish regulations for all new commercial vessels
- Establish regulations permitting the use of tugs when vessel inherent maneuvering performance is not acceptable
- Establish regulations for all new and existing commercial vessels.

An important part of this study was to determine which of these alternatives were feasible and which was most appropriate.

1.3 Scope of Study

This report describes all work carried out during the study and summarizes results given in earlier Technical Notes and Reports (Barr, et al, 1981, Barr and Miller, 1981, etc.)

The study consisted of the following tasks:

1. Collect available trials data and incorporate them in a ship maneuvering data base program.
2. Analyze these trials data to determine statistical distributions of ship maneuvering performance.
3. Conduct maneuvering simulations for ships for which maneuvering qualities were known to determine behavior in standard maneuvers.
4. Determine the effect of wind on ship controllability.
5. Consider the effect of machinery on controllability.
6. Review CRG casualty data to determine if a correlation between frequency of casualties and maneuvering performance could be established.
7. Establish, based on results of Tasks 2-6 above, proposed maneuvering performance standards which can be used to evaluate the controllability of any commercial oceangoing or Great Lakes vessels over 1000 metric tons displacement intended for the normal transport of cargo or passengers.

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2.0 BACKGROUND ON SHIP CONTROLLABILITY, MANEUVERING STANDARDS AND CASUALTIES

2.1 Introduction

Increased ship controllability can have a number of benefits, foremost of which is the possibility of reducing collisions, rammings and groundings (hereafter called CRGs), which are the type of ship casualties directly related to controllability. Various studies have defined relationships between such casualties and controllability. However, no standards for ship maneuvering performance exist. The reasons why no such standards currently exist and the relationships between CRG casualties and ship maneuvering or controllability are briefly reviewed in this section.

2.2 Lack of Performance Requirements or Standards

There are presently no national or international performance requirements or standards for maneuvering and stopping abilities of vessels. It is useful to review the implications of this for the process and type of maneuvering standards which may be developed. Several reasons may be listed as to why there are now no standards. They include:

1. Tradition: Ships have been designed for a very long time and designers have learned that, if normal proportions are followed, and a typical-sized rudder provided, the maneuvering performance will not be an obvious problem. Assuming no special requirements, there are very few cases of ships being rejected by owners because of maneuvering performance. If it can be steered at sea and stopped it is "acceptable".
2. Adaptability of Operators: With experience the human operator is a very adaptable controller and can learn to at least partially compensate. The operator can generally improve the maneuvering and stopping performance in difficult situations. This is done by speed reduction (reduces stopping distance and makes available the rudder kick effect for initiating and checking turns) and the aid of tugs.
3. Economic Incentive: The ship owner does not have a clear economic incentive to improve maneuvering performance. A ship with poor maneuvering performance may be more likely to have a casualty or be subject to delay due to low maneuvering speed, but this is hard to prove and/or is covered

by insurance, the cost of which is insensitive to performance. There will probably be great resistance to requirements which increase the very visible initial ship cost even if, in the long term, reduced costs (including the losses to others due to casualties) result.

2.2.1 Likely Nature of Standards - Given these reasons for a lack of standards at this time, it is reasonable to expect that:

A. Wholly acceptable maneuvering standards will not be developed in a short time. SNAME H-10 Panel has been discussing maneuvering standards off and on for 20 years.

B. Rigid standards probably will not be successful. Such standards reflect a thou shall/thou shall not approach in which some poor ships are judged unacceptable and their operations restricted or prohibited. An example would be that a ship of a given type and size must have a tactical diameter of no more than "X" ship lengths based on the fact that "Y" percent of similar ships have a tactical diameter of less than "X". This type of standard will be attacked because 1) the designer etc. can find successful ships that do not satisfy the requirement, 2) there is no clear connection with CRG casualties and 3) procedures such as speed management and tugs can be used when "better" maneuvering performance is required.

C. Suitable maneuvering performance standards, based on an evaluation or rating of a ship's maneuvering ability relative to certain established levels of performance, can be established using available data and will probably avoid most of the criticism of rigid standards. Such relative ratings may provide a greater incentive for owners to invest in improved maneuvering performance.

2.2.2 Data Available to Develop Standards - In general, available maneuvering data will be of three types. These types are 1) Numerical measures from definitive maneuvers (normal turns, zig-zags, crash stop and spirals) performed during formal trials. 2) Numerical measures from maneuvers performed during special trials and 3) Mathematical models developed from model tests and some day, from full scale trials by system identification. The formal trial data are the most numerous. Clarke (1970) and Della Logia, et al, (1975) reference and make use of data from numerous trials. Such previous work indicates that useful performance ratings could be developed using a sufficiently large and complete trials data base. Maneuvering standards could be developed solely on the basis of collecting and manipulating these data, although this alone will probably not result in meaningful standards. Rather, a more comprehensive approach in which the collection and analysis of reliable trials data is but one component, is required.

The results of special full scale maneuvering trials are particularly useful since the types of maneuvers performed have a more direct relationship to situations in which CRG casualties occur. The "ESSO OSAKA" trial is a classic example of such trials.

Maneuvering mathematical models (hydrodynamic data) can also be of great value. The biggest problem with math models is that they must be validated for the particular type of maneuver being studied.

2.3 Maneuvering Problems Associated with CRG Casualties

In the development of maneuvering standards, the types of maneuvering problems associated with CRG casualties should be considered. Much more work should have been done in this area than has been the case. However a number of references do address this. In these references, which are discussed in Section 3, the results of analyses of CRG casualty reports are presented.

Miller, et al (1981) show that in cases which vessel controllability could have affected the result, typical casualty situations reoccurred. These casualty situations are listed in Table 1 of the paper, which is reproduced as Appendix B of this report. This paper also suggested a number of controllability evaluation maneuvers that could be related to the typical casualty situations. These maneuvers and their relationship to the typical casualty situations are also listed in Table 1 of the paper. The important conclusion from this table is that controllability evaluation maneuvers can be related to CRG casualty situations and that these evaluation maneuvers are not necessarily the same as the maneuvers performed on normal trials and for which data are available.

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3.0 DEVELOPMENT OF TECHNICAL APPROACH AND BASIS

Factors influencing the establishment of realistic maneuvering performance standards have been discussed in preceding sections. The process can be divided into two areas. The first is to establish a rational approach which insures that the standards reflect the relationship between the ability of the ship to operate safely and some measurable indices of maneuvering performance. The second is to establish a basis for defining quantitative standards which reflect this relationship. The development of a technical approach and basis must attempt to reflect all of the factors discussed earlier.

3.1 Establishment of Approach

A crucial part of this effort was the development of a general approach which would best reflect our understanding of ship maneuvering performance and make the best use of available technical tools and data.

The approach selected uses available understanding and data in a three level process, which is outlined in Figure 1. This approach involves the establishment of:

- "Criteria" which could be used as a basis for selecting specific measures of performance.
- "Measures" of performance which would provide a basis for selecting quantitative performance levels.
- "Levels" of performance which would represent specific quantitative definitions of performance, i.e., superior performance, average performance, etc.

Figure 1 also includes the basic inputs used in developing each of these elements and indicates the dependence of each element on the other elements. Examples of criteria, measures and levels are also shown.

The proposed maneuvering performance standards presented in this report are based on a set of measures and levels of performance. Several distinct lines of approach have been followed, as described in the rest of Section 3,

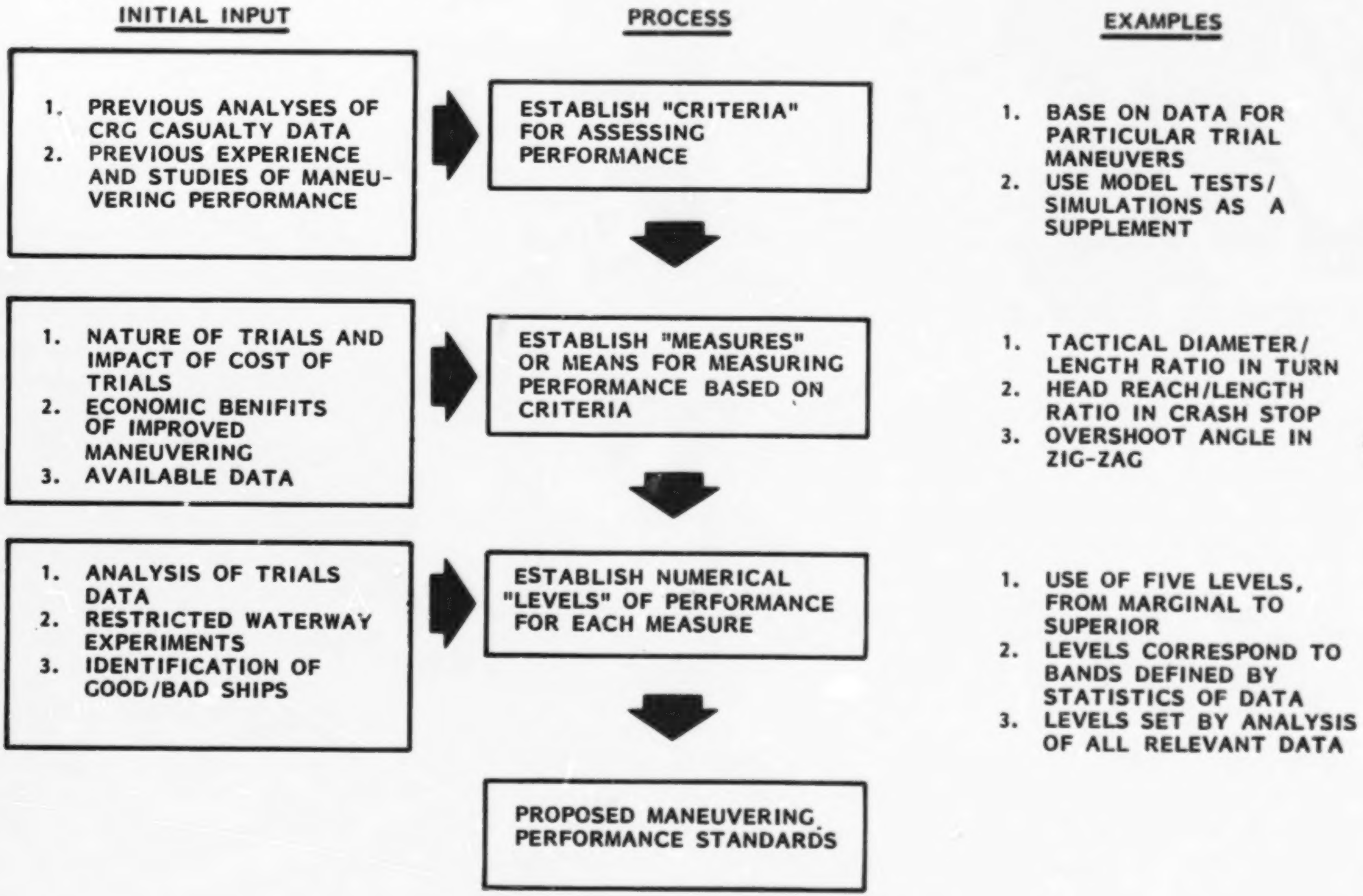

INITIAL INPUT
PROCESS
EXAMPLES
1. PREVIOUS ANALYSES OF CRG CASUALTY DATA
2. PREVIOUS EXPERIENCE AND STUDIES OF MANEUVERING PERFORMANCE
ESTABLISH "CRITERIA" FOR ASSESSING PERFORMANCE
1. BASE ON DATA FOR PARTICULAR TRIAL MANEUVERS
2. USE MODEL TESTS/ SIMULATIONS AS A SUPPLEMENT
1. NATURE OF TRIALS AND IMPACT OF COST OF TRIALS
2. ECONOMIC BENIFITS OF IMPROVED MANEUVERING
3. AVAILABLE DATA
ESTABLISH "MEASURES" OR MEANS FOR MEASURING PERFORMANCE BASED ON CRITERIA
1. TACTICAL DIAMETER/ LENGTH RATIO IN TURN
2. HEAD REACH/LENGTH RATIO IN CRASH STOP
3. OVERSHOOT ANGLE IN ZIG-ZAG
1. ANALYSIS OF TRIALS DATA
2. RESTRICTED WATERWAY EXPERIMENTS
3. IDENTIFICATION OF GOOD/BAD SHIPS
ESTABLISH NUMERICAL "LEVELS" OF PERFORMANCE FOR EACH MEASURE
1. USE OF FIVE LEVELS, FROM MARGINAL TO SUPERIOR
2. LEVELS CORRESPOND TO BANDS DEFINED BY STATISTICS OF DATA
3. LEVELS SET BY ANALYSIS OF ALL RELEVANT DATA
PROPOSED MANEUVERING PERFORMANCE STANDARDS

FIGURE 1 - DEVELOPMENT OF CRITERIA, MEASURES AND LEVELS FOR MANEUVERING PERFORMANCE STANDARDS

in selecting measures and levels of performance. These include:

- o A review of previous ship casualty studies and an analysis of ship casualty data to see what correlation could be established between ship maneuvering performance and frequency of maneuvering related casualties. (Section 3.3.)
- o A collection and analysis of available ship trials data and correlation with available assessments of ship maneuvering capabilities to see if ship maneuvering performance can be characterized by the ship's performance in selected trials maneuvers. (Sections 3.4 and 3.5.)
- o Simulations of the effect of ship aerodynamic characteristics on the ability of a ship to maintain course and/or execute a desired maneuver. (Section 3.6.)

3.2 Maneuvering Performance Requirements and Measures

All vessels must have the inherent maneuvering capability to allow them to be navigated from Point A to Point B. From the standpoint of maneuvering performance, the greatest demands will occur in restricted waters. As a minimum this requires that the vessel be able to initiate and check a turn, maintain course, stop, operate at moderate speeds and not be overly sensitive to the environment, in particular wind. The MarAd Computer Aided Operations Research Facility (CAORF) restricted waterways studies, Atkins and Bertsche (1980) have addressed the ability of a ship to maneuver under these conditions, and provided a good introduction to the performance of maneuvers under restricted conditions. These aspects of maneuvering should be addressed by maneuvering performance standards.

There are aspects of maneuvering performance which are not considered by the proposed standards. One concerns the maneuvering performance in an emergency situation such as that resulting from a steering gear or machinery failure. In such situations the results depend largely on the initial speed, environment and the availability of assistance. In any event, this study has not considered maneuvering requirements subsequent to a failure.

The other aspect of maneuvering performance not considered is the case or situations which require special maneuvering capabilities. The most common of these would involve operating a large vessel in very restricted conditions, operating in unusual environments or the requirement for stationkeeping, coursekeeping, etc. It was felt that these special situations were beyond the scope of this study and that in such situations the maneuvering performance requirements of the vessel to be used should be specifically determined and modifications to the vessel or other aspects of the system made as required.

In summary, the standards are intended to cover operating conditions representative for maneuvering and to provide a ranking of performance relative to other vessels of a similar size and type. Performance standards should be defined on the basis of a vessel's ability to initiate and check a course change, turn, maintain course, stop, to operate continuously at moderate speeds and operate in normal environments.

It is necessary to establish specific measures of or quantitatively defined methods for describing ship performance of a given maneuver. In the selection of measures of maneuvering performance for use in standards, it is necessary to consider the following criteria:

- The measure should be directly related to the type of performance being rated, i.e., head reach is a good measure of stopping ability,
- The measures should be ones which can be based on available data for existing ships since the rankings are relative.
- The performance in a given measure should be able to be determined from trials,
- There should not be a significant increase in the complexity or time required for trials needed to establish performance standards.

At present, commercial ship maneuvering performance is generally characterized by performance of two standards trials maneuvers, maximum rudder angle turns and crash stop. It has now become standard practice to post results of these maneuvers on the ship's bridge, as discussed by Landsburg, et.al. (1980). In many cases, trials also include additional standard maneuvers such as zig-zag and spiral maneuvers or turns at smaller rudder angles. The nature and conduct of various standard maneuvers are discussed in detail in a SNAME Research Bulletin (1974) and in the Maneuvering Committee Report to the Fourteenth International Towing Tank Conference (ITTC, 1975). This portion of the ITTC report is included as Appendix A of this report.

Table 1, from the 1975 ITTC report, compares recommended or proposed maneuvering trials from various sources (see Appendix A). The most widely proposed tests are the full speed turning test and the zig-zag (all five sources) and the full speed crash stop (four sources). These are, in fact, the most widely conducted maneuvers. Each of the maneuvers of Table 1 is described in Appendix A, as are the usual measures derived from these maneuvers.

Based on these considerations and on the previously defined "criteria", the following "measures" of maneuvering performance were ultimately selected for use in the performance standards (see Sections 3.4 - 3.6).

- Turning and Coursekeeping -
  1. The tactical diameter/length ratio for a full rudder angle turn at full maneuvering speed. (eight to 10 knots)
  2. The overshoot angle from a 20-20 zig-zag maneuver performed at full maneuvering speed.
  3. The K'-T' relationship from a 20-20 zig-zag maneuver performed at full maneuvering speed.
- Stopping -
  4. The head reach/length ratio of a crash stopping maneuver from a steady initial reduced maneuvering speed of eight knots.
- Ability to Operate at Moderate Speed -
  5. The ability to operate continuously at a speed between four and six knots for all ship load conditions.
- For Operation Under Severe Environment -
  6. The ability to operate at any heading to the wind at some representative severe wind condition.

TABLE 1

Maneuvering Trials Recommended by Various Organizations

	BSRA	SNAME	DnV	10th ITTC	14th ITTC
Crash-stop (AV) at full speed	x	x	x		x
Stopping trial at low speed					x
Coasting stop test			x		
Crash-stop (AR)		x			
Stopping by use of rudder			x		
Turning test at full speed	x	x	x	x	x
Turning test at medium speed					x
Turning test at slow speed	x		x		x
Turning test with propulsion stopped			x		
Turning test from zero speed	x				x
Pull-out	x				x
Weave manoeuvre	x				
Zigzag	x	x	x	x	x
Direct spiral	x			x	x
Reverse spiral	x		x		x
Statistical method	x				
Change of heading				x	x
Lateral thruster :					
- Turning test			x		x
- Zigzag test, ahead			x		x
- Zigzag test, astern			x		x
- Course-keep test, astern			x		

In addition, there are other aspects of ship maneuvering which have been identifed as important but which are not covered by these measures. They include the effects of wind and current and special maneuvering requirements imposed in restricted water situations. The effects of windage can be significant but it is not practical to quantify it by the conduct of routine trials. Thus it is proposed to require a special investigation of the effect of wind during the design stages for vessels which exceed a certain ratio of above water profile.area to below water profile aree. This is discussed further in Section 3.5.

Discussion with pilots indicate that one of the most important aspects of maneuverability in restricted waters is the ability to maintain control while coasting and slowing down. This can be done by direct control with the rudder and/or alternately going astern and ahead and using the improved rudder effectiveness from the propeller slip stream. This aspect of a ship's maneuvering performance could be characterized by a coasting zig-zag maneuver. Such maneuvers are not routinely performed so there is no body of data against which to compare performance. Such a maneuver would also increase the time and complexity of the trials. An alternate to an additional trial maneuver is to require special investigation of the maneuvering performance of vessels which have characteristics which are known to cause poor low speed control. These characteristics include vessels with rudders located outside of the propeller race and diesel powered vessels with such a small amount of starting air that the engines can not be reversed as often as desired. At this time it is recommended that the approach of special investigation for vessels with such characteristics be followed. This should be considered further.

Once measures of maneuvering performance have been selected, it is necessary to set quantitative values or "levels" of these measures which correspond to various rankings or ratings. These levels should be established based on the following:

o Performance levels which are known, on the basis of operating experience or simulation studies, to increase or reduce casualty risk.

- Performance levels that significantly differ from those of other vessels of similar size and type, i.e., performance which a pilot would not expect.
- Performance levels of vessels identified by pilots as "problem vessels" or "superior vessels".
- Performance levels of vessels with a large number of casualties.

Sections 3.3 - 3.6 describe in detail the establishment of rankings based on levels of performance defined by these considerations. It should be noted that the proposed rankings are based almost entirely on the first two of these factors. The latter two factors need further study so that performance rankings can adequately reflect all four factors.

One important factor which must be considered in establishing performance measures and levels is whether to use dimensional or nondimensional parameters. The particular measures selected in this study are those which are felt to provide the best means for assessing performance. Most of the measures selected involve some degree of nondimensionalizations, as described in Sections 3.5 and 3.6, in order to suitably systematize the data.

3.3 Use of Casualty Data Analyses

Two previous studies which are based in part or in whole on analyses of ship CRG casualty data, Miller, et. al., (1981) and Paramore, et. al., (1979), discuss the relationship between CRG casualties and ship controllability. Relevant results from these studies are briefly reviewed below and the first of these references is incorporated in this report as Appendix B.

3.3.1 Improved Tanker Controllability Study - The most relevant conclusions from this study by Miller, et. al., (1981) are summarzied in Figure 2. This figure shows the percentage of casualties attributed to various factors and particularly to controllability factors. Appendix C presents a paper by Landsberg, et. al., (1980), which discusses the types of trials data used in ship bridge posting data.

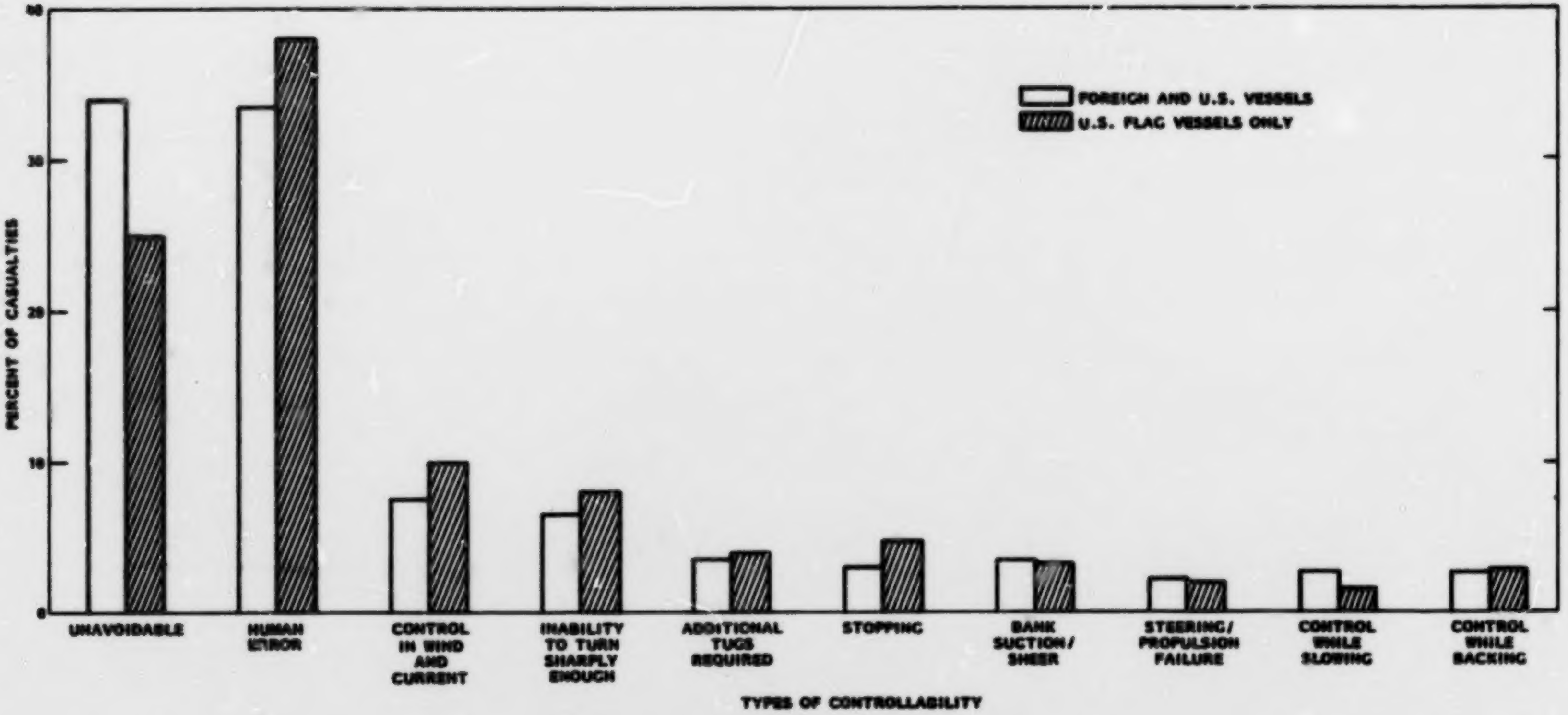


FIGURE 2 - PERCENTAGES OF CASUALTIES RELATED TO VARIOUS TYPES OF CONTROLLABILITY FROM MILLER, ET AL. (1977)

The potential problem that typical maneuvering trial definitive maneuvers are not necessarily related to maneuvering problems associated with CRG casualties is further illustrated by information from ship pilots. Discussions of the basic question, "What maneuvering characteristics cause the most problems," with a number of pilots have produced a number of typical answers, including:

- Ships that are hard to control while slowing down. Single rudder twin screw container ships and ships with controllable pitch (CRP) props that block the flow to the rudder are examples.
- Ships that cannot run dead slow when required. Some diesel ships have this problem.
- Ships with some limitation on use or response to astern RPM's commands. Diesel ships with limited engine starts or steam vessels with boiler water level problems are examples.
- Ships that develop a high turn rate and require a long time to check. The open stern LNG ships are an example.

The following are considered to be important considerations in the development of maneuvering standards. The considerations include:

- The development of maneuvering standards is a complex problem.
- There should be some relationship between maneuverability standards and the types of problems which result in CRG Casualties.
- Extensive full scale maneuvering trial data are available for only two or three finite maneuvers, but it should be possible to develop standards using results only for these maneuvers.

It is useful, in considering ship trials and performance in trials maneuvers, to consider the special deep and shallow water trials of the ESSO OSAKA, Crane (1979), which provide the only known example of maneuvering trials encompassing most of the trials in Table 1. The OSAKA trials include normal, accelerating and coasting turns and zig-zags and crash stops. These trials were carried out in deep water, shallow water (depth of 1.2 ship drafts) and medium depth water (depth of 1.5 ship drafts). It is not possible to discuss the results of these trials here, but it can be noted that large differences in ship behavior occurred with normal, coasting and accelerating maneuvers.

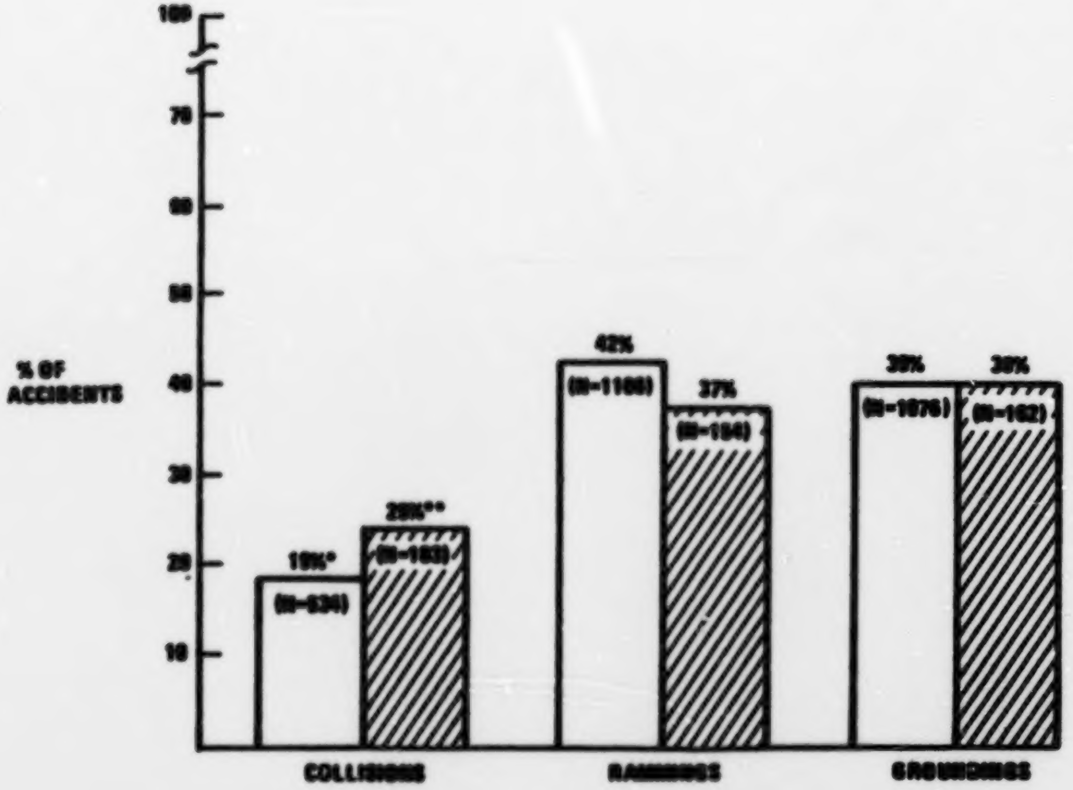
Figure 2 presents a distribution of causality and indicates that approximately 35 percent of the 835 CRG casualties considered were related to controllability. The most frequently identified controllability cause factors and corresponding percentages of all casualties for each are: control in wind and current (8%); inability to turn sharply enough (7%); additional tugs required (4%) and stopping (4%). The need for additional tugs is probably a combination of human error and controllability factors such as control in wind and current or stopping. Miller et. al., (1981) conclude that of the eight CRG casualties to be expected during a 20 year ship lifetime, almost three casualties might be avoided with improved controllability.

3.3.2 Restricted Water Casualty Studies - A study of CRG casualties in harbors and entrances is reported by Paramore, et. al., (1979). Results of this study are briefly summarized below.

Casualties in harbors and entrances for a five year period (FY 1972-1976) involving at least one ship over 10,000 gross register tons were considered. After screening, 419 cases out of a total of 2805 casualties were selected for detailed study. Rammings and groundings were found to be approximately twice as frequent as collisions, as shown in Figure 3. The human factors involved in collisions were found to be:

> "... of a different character than those involved in the groundings and rammings. The latter two types of accidents were found typically to be cases of inability to maintain control. ... The collisions, by contrast, were found to occur most often when essential tasks were omitted ....,"

The second most frequent cause of collisions was found to be failure to maintain navigational position, which was found in 36 percent of cases. This was associated with:



NOTES:
2776 CASES IN TOTAL POPULATION INITIALLY IDENTIFIED THROUGH COAST GUARD AUTOMATED VESSEL CASUALTY FILE.

419 CASES IN STUDY SAMPLE, i.e., 15% OF POPULATION TOTAL:

- SAMPLE COLLISIONS 19% OF POPULATION COLLISIONS
- SAMPLE RAMMINGS 13% OF POPULATION RAMMINGS
- SAMPLE GROUNDINGS 15% OF POPULATION GROUNDINGS

* % OF ALL ACCIDENTS IN POPULATION

** % OF ALL ACCIDENTS IN SAMPLE

☐ POPULATION

▨ SAMPLE

FIGURE 3 – DISTRIBUTION OF COLLISIONS, RAMMINGS AND GROUNDINGS: COMPARISON OF SAMPLE TO POPULATION – FROM PARAMORE, ET AL (1979)

"insufficient knowledge of vessel response characteristics, and also with current or wind as an accident factor. There were two typical scenarios involving failure to maintain position. In one, the most common, the vessel was forced out of position by environmental effects (e.g., current, wind, suction) while, apparently, a sound maneuvering plan was being executed. In the other common scenarios, the report indicated that maneuvering was inappropriate and, as it turned out, infeasible."

Paramore, et. al., (1979) concluded that for groundings, "Just over 60 percent of the groundings studied involved failure to maintain position resulting from:

- o Incorrect assessment of current force or, to a lesser extent, wind force. (This was called a problem in hazard "identification" -- i.e., in determining the nature/extent of the hazard with sufficient precision.)
- o Incorrect assessment of vessel response characteristics.
- o A combination of the two."

With regard to groundings they further concluded that

- "o Twenty-six percent of the groundings occurred when the vessel was negotiating a sharp (>20 deg) turn
- o One-third of the groundings took place when wind speed exceeded 10 knots. Sea swell over 4 feet was reported in 11 percent of the groundings."

Paramore, et. al., (1979) concluded that for rammings:

- "o The ships involved in the rammings tended to be larger than those involved in the collisions and groundings ... The greatest opportunity for ramming obviously occurs during maneuvering in limited space, near some other physical object(s). The larger the vessel the less the margin for control error."

"o Thirty-eight percent of the rammings took place when the wind speed was in excess of 10 knots."

"o ....combined effects of current and wind are reported in rammings whereas in groundings the two forces typically were not both cited in the same case."

In the concluding remarks it is also noted that:

> "A commonly proposed solution is to enhance vessel maneuverability by increasing horsepower. The study results do not suggest that this would be productive, except that wider use of bow thrusters would help to reduce the incidence of accidents involving ships, and also barge arrays of the push variety. This solution is applicable to the large number of cases involving failure to maintain position at low speed. The potential for ramming while docking, in particular, could be reduced by this means."

3.3.3 Present Study of Ships with Multiple CRG Casualties - As part of this study, CRG casualties to U.S. Flag vessels during the period 1975-1979 were investigated using the Coast Guard Casualty Data Base. 112 ships were identified as having 2 or more casualties which could be related to controllability. The goal was to identify any of these ships which were also in the maneuvering data base and to see if any correlation with poor performance in one or more trials maneuvers existed for these ships. This investigation is described in detail in Appendix D.

This goal was not achieved because it was not possible to establish one-to-one correspondances between particular ships with multiple casualties and ships in the maneuvering data base. The correspondence of ship displacements and dimensions in many cases provides strong evidence that ships with multiple casualties are of the same class as ships in the maneuvering data base. It was not possible to correlate results by ship class, as should be done.

A correlation of casualty and maneuvering performance data is undoubtedly an important tool for establishing performance standards. The limited investigation described here and in Appendix D should be expanded to cover a longer time period and should include an identification of ships and correlation of results by ship class.

3.3.4 Relationship of Casualty Analyses to Measures of Maneuvering Performance. - The analyses of casualty data described in this section lead to several findings affecting selection of specific trials maneuvers and associated performance measures appropriate to maneuvering performance standards. These findings include:

- Actual maneuvers associated with typical CRG casualties do not correspond directly to specific available trials maneuvers, but appear, to be related to a number of definable maneuvers.
- Trials have generally been limited to normal turns, normal zig-zags and/or crash stops. Miller, et. al., (1981) indicate that most types of controllability associated with normal ship operations are related to one or two of these maneuvers.
- It will generally not be economically feasible to conduct most or all of the relevant trials listed in Table 1. However, limited maneuvering trials, as now conducted, can be supplemented by limited special trials and/or special investigations of factors affecting low speed controllability.
- It is essential that ship controllability at low speeds be demonstrated by some means. One means is to conduct trials of coasting maneuvers (turn or zig-zag) and/or accelerating turns. A second means is to demonstrate the ability of the ship to maintain course at maneuvering speeds (say four to six knots) and to execute a number of propeller RPM reversals in a short time period. A final method is to use captive model tests and maneuvering simulations. Such demonstrations are particularly important for ships in which the rudder(s) is(are) not directly behind the propeller(s), or for ships with diesel engines having limited restart capability.
- Environment plays an important role in many casualties, and the influence of environment, and particularly wind, on maneuvering should be reflected in any performance standards.

These conclusions played an important role in the formulation of performance measures.

3.4 Relationship Between Performance Under Realistic Operating Conditions and Performance of Definitive or Trials Maneuvers

One means for establishing maneuvering performance standards is to establish a correlation between the ability of given ships to carry out difficult but realistic maneuvers, such as transit of a narrow, winding channel, and the ability of the same ships to execute definative maneuvers such as zig-zags and turns. Unfortunately, few relevant data are available.

One set of data which appeared useful for this purpose was the results of simulation experiments by five pilots at CAORF, Atkins and Bertsche (1980). Each pilot made 16 transits of a canal, during which the ability of the ship to remain within the 500 foot wide channel and to avoid other ship traffic was determined. The use of these experiments as a basis for correlation is discussed in this section. Analysis of the results is not yet complete.

3.4.1 CAORF Restricted Waterways Experiments - A series of simulation experiments was carried out at CAORF to study the ability of a typical 80,000 DWT tanker to transit a representative restricted channel, as shown in Figure 4. Results of experiments with this tanker and with a tanker which was identical except that it had half the rudder forces of the original tanker, are reported by Atkins and Bertsche

Table 2 from this study compares the ability of the original tanker and the degraded tanker to successfully complete turns in a representative environment. The overall success rate is 41 percent greater with the original ship than with the degraded ship. This difference was large enough to give some hope that a useful correlation with differences in performance of definative maneuvers could be achieved.

The CAORF simulation experiments were conducted with an initial ship speed of six knots. The environmental conditions used in the experiment are given

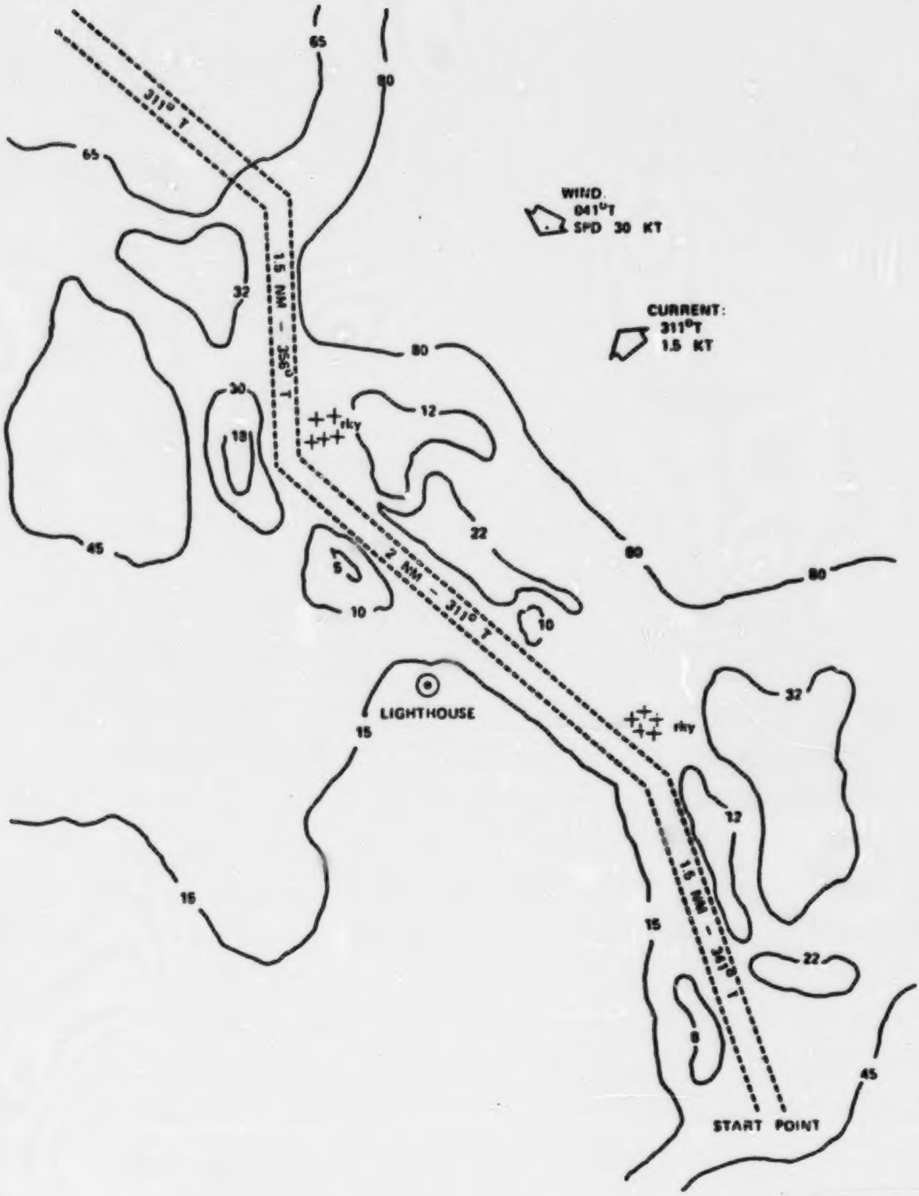

311° T
65
80
65
WIND:
041°T
SPD 30 KT
CURRENT:
311°T
1.5 KT
32
1.5 NM - 356° T
80
30
18
12
rky
22
45
5
2 NM - 311° T
10
10
80
80
LIGHTHOUSE
15
32
rky
12
15
15
1.5 NM - 341° T
22
8
45
START POINT

FIGURE 4 - CHANNEL USED IN CAORF RESTRICTED WATERWAYS EXPERIMENTS

TABLE 2 SUCCESS PROPORTIONS BETWEEN RUDDER SIZE VARIATIONS FOR ALL TURNS AND SIGNIFICANCE OF COMPARISONS

Condition	Full Rudder Effectiveness			One-Half Rudder Effectiveness			Significance at 95% Confidence Level
	No. Trials	Successes	Percent	No. Trials	Successes	Percent	
All turns	116	61	52.6	115	43	37.4	Yes
All corner buoy turns	30	19	63.3	30	9	30.0	Yes
All gated buoy turns	29	15	51.7	30	12	40.0	-
All range turns	30	11	36.7	26	7	26.9	-
All precise navigator turns	27	16	59.3	29	15	51.7	-

in Figure 4. The channel water depth was sufficiently large that it could be considered deep water.

3.4.2 Definitive Maneuvers for CAORF Ships - Results of definitive maneuvers for the original and degraded tankers used in the CAORF experiments were not available. Definitive maneuvers for these ships were therefore simulated at HYDRONAUTICS using a mathematical model for the 80,000 DWT tanker incorporated in the Coast Guard Ship Maneuvering Simulator, Barr, et. al., (1980), which was similar to the CAORF model used by Atkins and Bertsche (1980). Based on the known similarities of the two simulation models, the results obtained with the HYDRONAUTICS and CAORF simulators should be very similar. The mathematical model for the degraded ship was created in the same way as the degrated ship model used at CAORF; the magnitudes of all rudder coefficients in the original ship model were reduced by 50 percent to reflect the 50 percent reduction in rudder area. The degraded ship is not really the same ship with reduced rudder size, but a somewhat different ship, as no account has been taken in the model of the effect of reduced rudder size on other hydrodynamic coefficients.

The following definitive maneuvers were carried out for the original and degraded ships

20 degree starboard turn
35 degree port and starboard turns
10-10 zig-zag
20-20 zig-zag

No stopping maneuvers were simulated as the change in rudder size has no direct effect on stopping and the maneuvers simulated at CAORF did not include stopping.

The results of these simulations are summarized in Table 3 and Figure 5. Table 3 compares maneuvering ability, tactical diameter and 20-20 zig-zag overshoot angles for both ships. Figure 5 compares the K'-T' value sets for the original and "degraded" 80,000 DWT tanker with results for other ships.

TABLE 3

Comparision of Maneuvering Performance of 80,000 DWT Tanker With Original and Reduced Rudder Effectivenesses

Rudder Size	Percent of Successful Passages		Tactical Diameter	Overshoot Angle
	All Turns	All Corner Buoy Turns		
100%	53	63	2150	9.5°
50%	37	30	3390	12.0°
Percent Change	-30	52	+ 58%	+26%

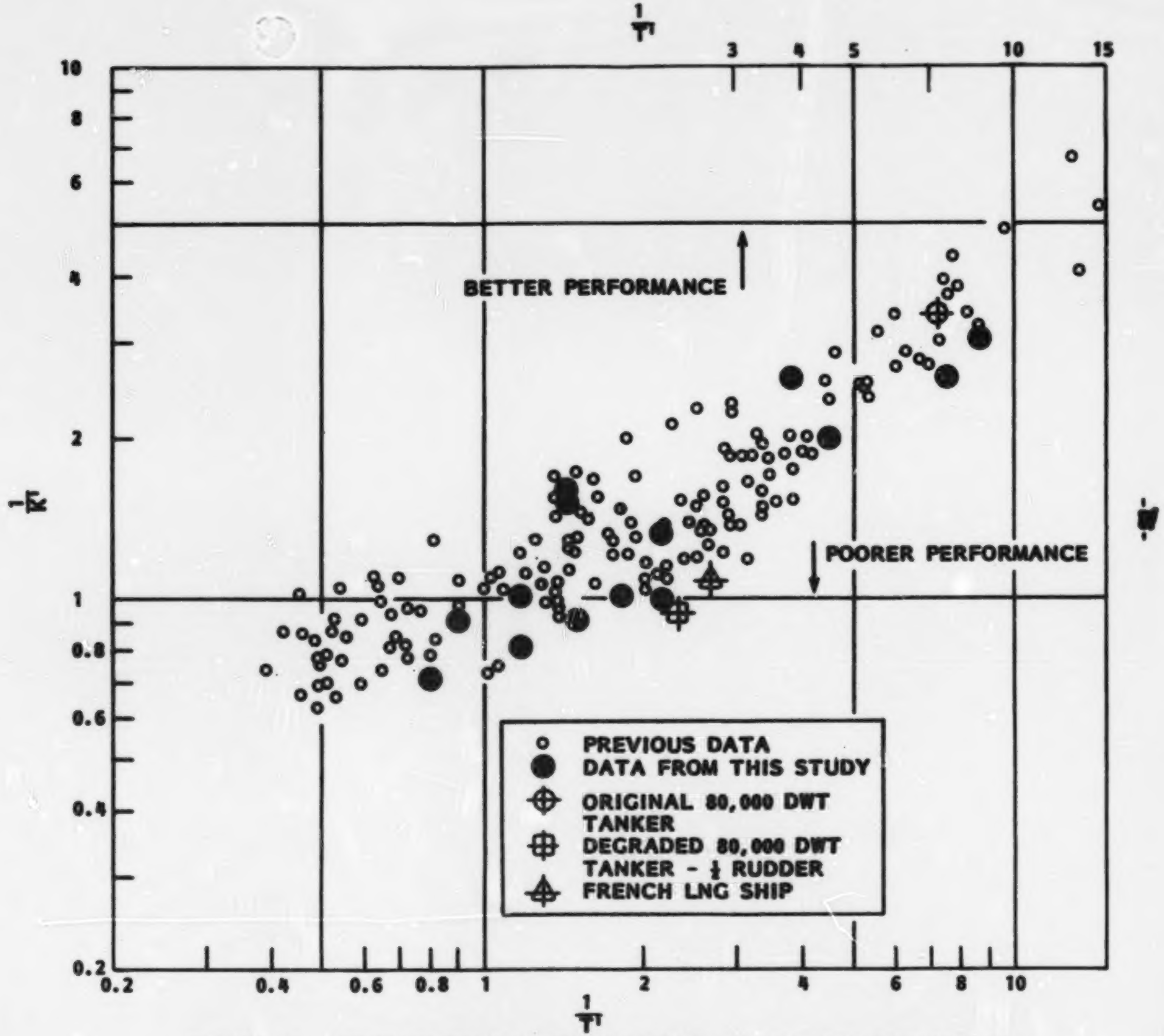


FIGURE 5 - COMPARISON OF PRESENT DATA FOR ZIG-ZAG MANEUVERS WITH EARLIER DATA SURVEY

The "degraded" ship has a 26 percent larger overshoot angle and a 58 percent larger tactical diameter. The ability of the degraded ship to successfully negotiate required turns in the passage is 42 percent less (success rate reduced from 52 to 30 percent). In the CAORF experiments, success rates were measured in simulated passages by experienced pilots after those pilots had familiarized themselves with both vessels and the results reflect the ability of the pilots to partially compensate for the poorer controllability of the "degraded" ship.

Figure 5 shows the K'-T' values for the original ship and ship with reduced rudder size, superimposed on the plot of all available K'-T' data. The original ship falls almost on the mean curve of the data, average behavior; this 80,000 DWT tanker is known to have typical maneuvering ability. The ship with reduced rudder area, on the other hand, falls at the extreme lower limit of all data, indicating unusually poor handling characteristics.

3.4.3 Observed Ship Handling Behavior - In the absence of other quantitative data on ship maneuverability under realistic conditions, qualitative observational data for ships with unusually good or poor maneuverability or handling characteristics can be very useful. One of the goals of this study, which was not realized, was to identify ships in the data base which were generally known to have unusually good or poor maneuvering or handling behavior. One ship known to have particularly poor handling characteristics, a French 125,000 m^3 LNG ship, was identified. K'-T' values for this ship were plotted on Figure 5; they fall very near the half-rudder 80,000 DWT tanker, at the lower extremity of all K'-T' data. It thus seems reasonable to assume that ships in the range of values should be considered marginal, since both of these ships are considered marginal.

3.5 Collection and Analyses of Available Trials Data

Early in the study it was concluded that a collection and analysis of available ship trials data would be an important and necessary step in the development of maneuvering performance standards, even though experience indicated that such standards could not be based solely on an analysis of trials data alone. In order to insure statistical validity of any conclusions based on analysis of trials data it was considered essential to collect data for as many ships as possible. In all data for 603 ships was collected, placed in the Ship Maneuvering Data Base described in Section 3.5.1, and used in the data analyses described in Sections 3.5.2 through 3.5.4.

Appendix E provides a listing of the ships and the data for each ship contained in the Data Base. These data were collected from trade jounals and publications, ship owners, shipyards and reports of various nations to the Inter-Governmental Maritime Consultative Organization (IMCO). More data were obtained from the maneuvering summary sheets submitted to IMCO than from all other sources combined. Tankers are by far the largest group of ships in the data base, followed by bulk carriers. The distribution of data base ships, by type, is given in Table 4. In the listing given in Appendix E ships are identifed by a ship number; ship names are not used because some of the data used are proprietary and could be used only if the data were not identified by ship name.

3.5.1 Development of Ship Maneuvering Data Base and Format - An important effort in this study was the development of a ship maneuvering trials data base program and the use of this program to analyze available trials data for standard maneuvers. The development and use of the data base is described in this section.

Based on an initial review of a large body of ship trials data, an initial format for a ship maneuvering data base was developed. Two versions of the data base format were submitted to the Coast Guard for review. Based on comments received from the Coast Guard and from members of SNAME Panel H-10, Ship Controllability, a final format was defined.

The general structure of the data format is described in Table 5, and includes data for the ship and for three types of maneuvers; stops, turns and zig-zags. These three maneuvers were selected as the only ship trials maneuvers for which a significant body of data were available; the data base program can be modified in the future to include other maneuvers if sufficient data for

TABLE 4

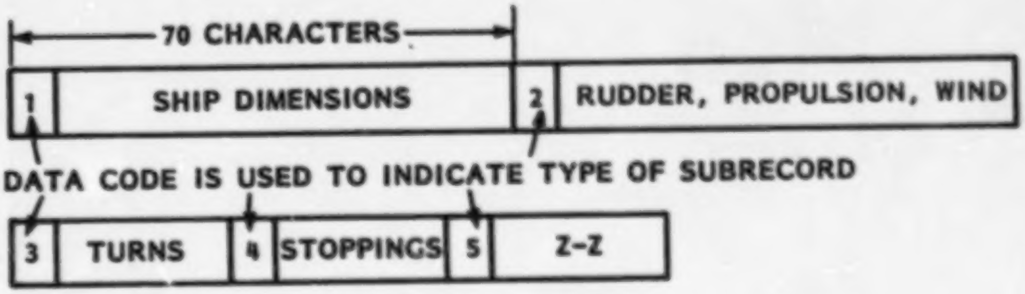
Distribution of Ship by Type in Maneuvering Data Base

Ship Type	No. of Ships
Tankers	364
Bulk Carriers	90
Cargo Ships	4
Container Ships	4
Others	4
Not Identified*	137

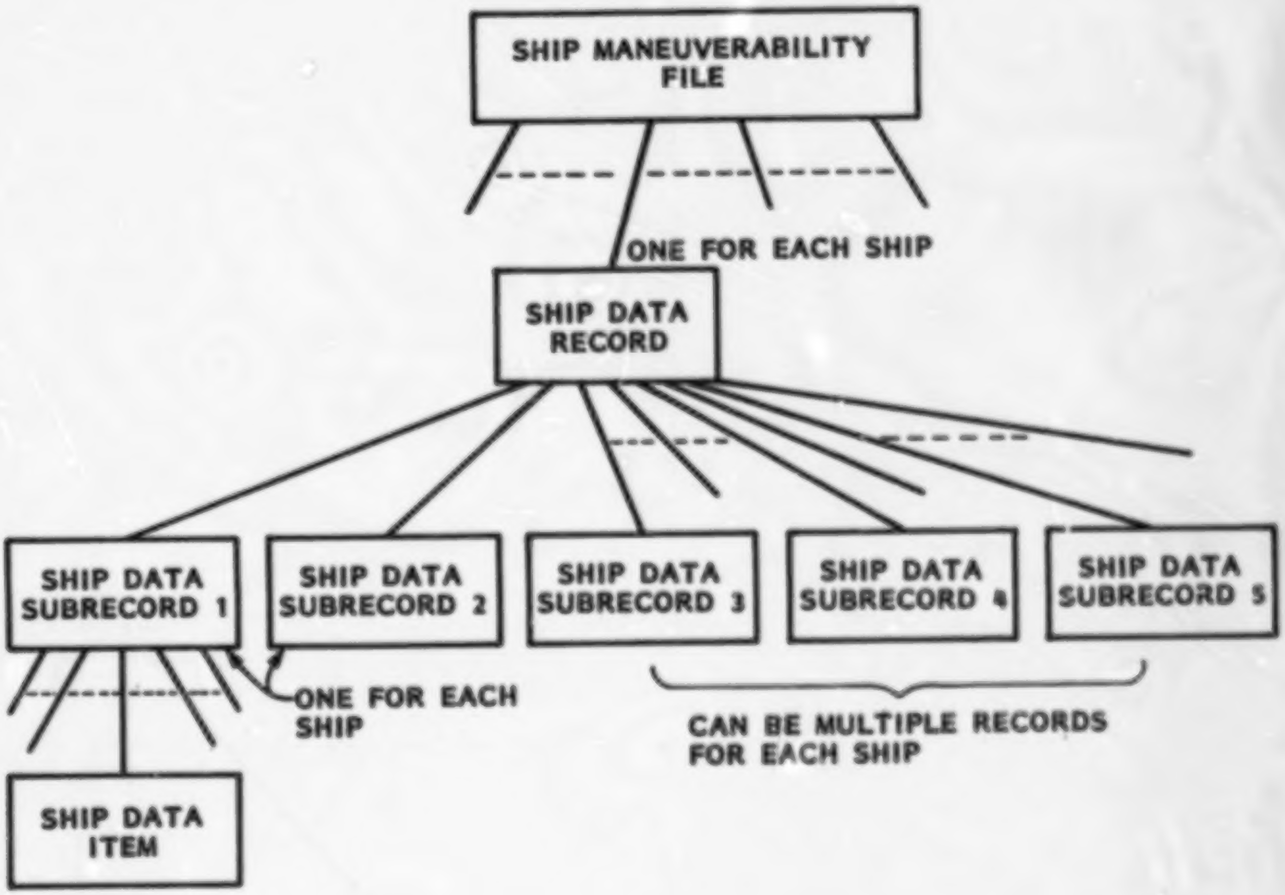
*For these ships, which were primarily from data provided to IMCO, all necessary ship characteristics and maneuvering performance data were provided, but the ship type was not identified. These data have been determined to be suitable for inclusion in the data base, despite the fact that the ship types were not identified.

TABLE 5

ORGANIZATION OF SHIP MANEUVERING PERFORMANCE DATA FILE


70 CHARACTERS
1
SHIP DIMENSIONS
2
RUDDER, PROPULSION, WIND
DATA CODE IS USED TO INDICATE TYPE OF SUBRECORD
3
TURNS
4
STOPPINGS
5
Z-Z

Each subrecord contains 70 characters


SHIP MANEUVERABILITY FILE
ONE FOR EACH SHIP
SHIP DATA RECORD
SHIP DATA SUBRECORD 1
SHIP DATA SUBRECORD 2
SHIP DATA SUBRECORD 3
SHIP DATA SUBRECORD 4
SHIP DATA SUBRECORD 5
ONE FOR EACH SHIP
CAN BE MULTIPLE RECORDS FOR EACH SHIP
SHIP DATA ITEM

these maneuvers are available.

The specific data included in the data base are outlined in Table 5 and described in more detail in Table 6. Provision is made for indicating that any given data item is unknown. Two ship data records must be provided for any ship entry. Data for at least one maneuvering record must also be provided for any ship entry. A maximum of 50 data records (two ship records plus up to 48 maneuvering records) can be included for any ship.

The data base and data base computer programs are described in more detail in Appendix F, which also contains the User's Manuals and listings for the computer programs.

3.5.2 Approach to Data Analyses - A primary purpose for creating the maneuvering performance data file was to provide a means for analyzing and assessing maneuvering performance. The data file has been used to make three types of analyses:

- Variation of direct measures of maneuvering performance (tactical diameter, head reach, etc.) with basic ship design parameters (length, displacement, etc.)
- Variation of non-dimensional maneuvering performance parameters with non-dimensional ship design parameters.
- Statistical variations of maneuvering performance data about observed mean behavior.

An extensive analysis of the trials data for all 603 ships contained in the maneuvering data file has been carried out. Various analyses have been carried out for stopping, turning and zig-zag maneuvers. For each of these maneuvers a number of dimensional and non-dimensional maneuvering performance and ship parameters were considered in various combinations to determine how well results could be correlated.

Initially this effort was not restricted to parameters which were judged to be potentially good measures of performance. As examples, crash stopping data were analyzed using a parameter involving astern horsepower and propeller

TABLE 6

SHIP MANEUVERING PERFORMANCE DATA FORMAT

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Item	Data Code	Ship Nationality	Ship No.	Type of Ship	Disp.	LBP	LOA	Beam	Draft	Trim	Bulb	Design Disp.	Service SHP	Service RPM

	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)
Item	Data Code	Service Speed	Rudder Area	Prop. Diam.	Ast. SHP	Rudder/ Stern Code	Engine Code	Prop/ Rudder Code	Lateral Wind Area	Wind LCA	Wind/ Wave Cod3	Trial Code

Maneuver

Turning Circle

	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)
Item	Data Code	Approach Speed	Final Speed	Rudder Angle	Advance	Transfer	Tactical Diam.	Final RPM

Maneuver

Stopping

	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)
Item	Data Code	Approach Speed	% Astern SHP	Rudder Command	Track Distance	Head Reach	Side Reach	Time to Stop	Time to RPM = 0

Maneuver

Zig-Zag

	(44)	(45)	(46)	(47)	(48)	(49)	(50)	(51)	(52)
Item	Data Code	Approach Speed	Rudder Angle	First Overshoot	Final Overshoot	Overshoot Width	K'*	T'*	Period

* These are the Motora/Norrbin zig-zag parameters

diameter, Clarke (1970), and zig-zag overshoot data were analyzed using a parameter involving rudder area, Della Logia, et. al., (1975), to determine how well the data in the data set fit these well established parametric relationships. Figures 6 and 7 indicate that these data generally followed these relationships quite closely. However, these parameters are really measures of ship maneuvering efficiency, or performance relative to what would be expected from a ship with this astern power, propeller diameter or rudder area. They are not good absolute measures of maneuvering performance, as required by maneuvering standards.

Once the significant performance measures were selected, data for each maneuver were analyzed by ship type. In general, sufficient data for analysis were available only for tankers and bulk carrier. However, available data were also analyzed for cargo and container ships and for all other ship types.

Results of initial data analysis as well as previous analyses have shown that important measures of maneuvering performance determined in trials, such as tactical diameter and head reach in turns and head reach in crash stops are generally proportional to ship size or length, and/or speed while other measures, such as overshoot angle in zig-zag maneuver are generally independent of ship size and speed. In developing maneuvering performance standards of general applicability it is therefore essential that selected measures reflect performance that is realistic for a given ship size and reflect trials speeds and rudder angles for which data were obtained.

Initial data analysis has been generally carried out by creating plots of the desired data or non-dimensional parameters derived from the data in the data file. The utility of the relationship embodied in the plot can generally be readily observed from the distribution of data. Figure 8 presents two examples of such plots, one where a clearly useful relationship exists and one where no useful relationship appears to exist. The actual process used to generate plots is described in Appendix F.

Statistical analyses were carried out for the data in those plots which indicate a relationship between the data or parameters in the plot which appeared

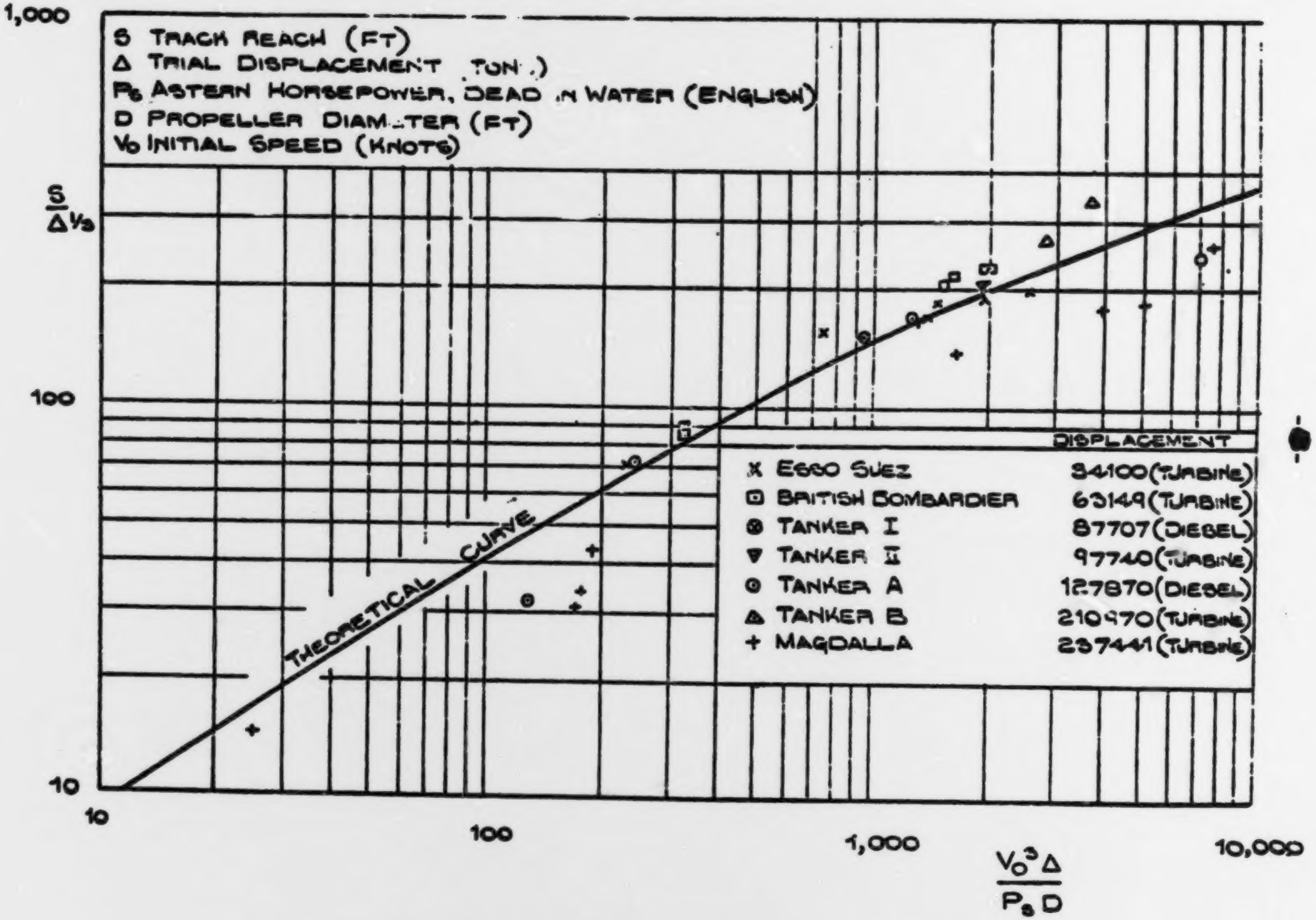


FIGURE 6 - CLARKE SHIP STOPPING PARAMETERS

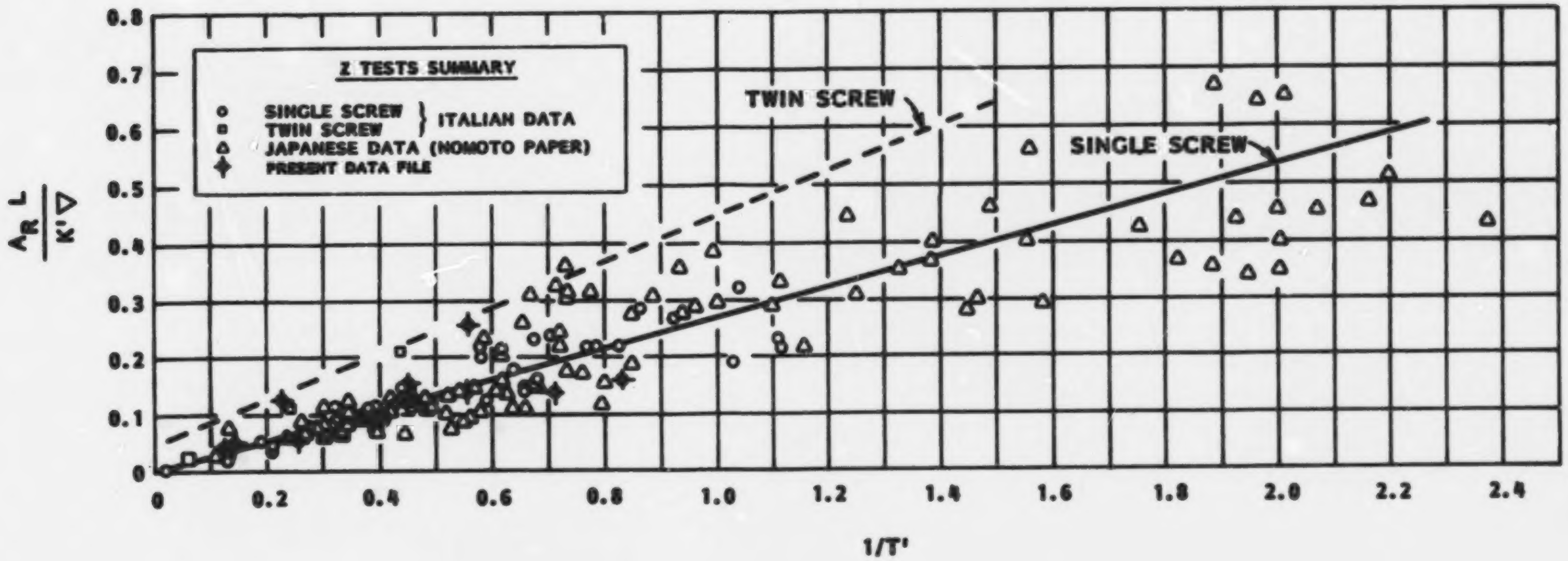
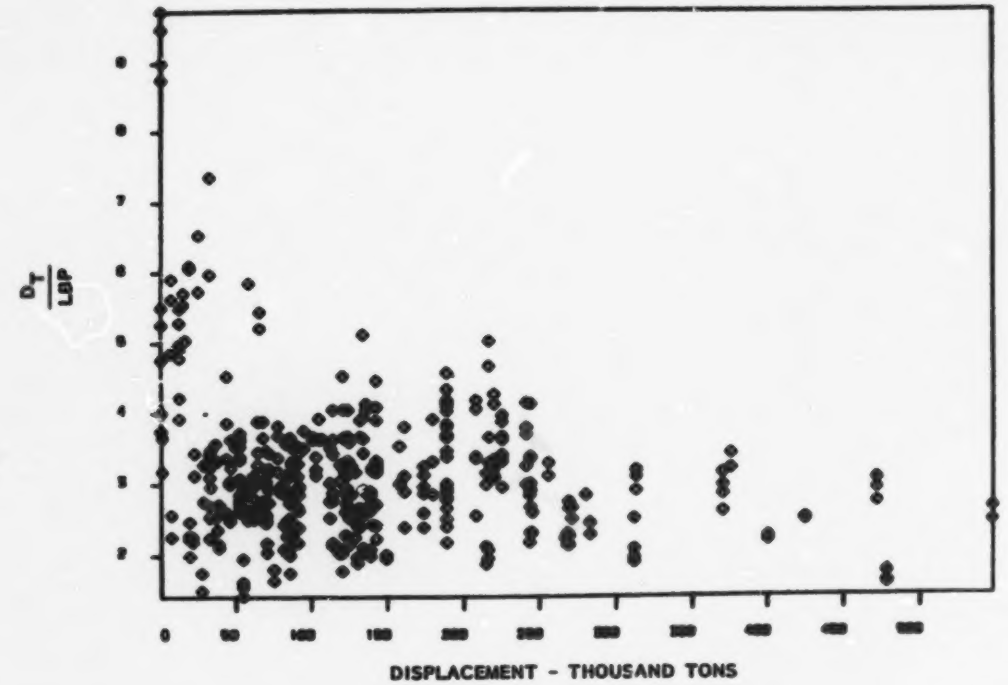
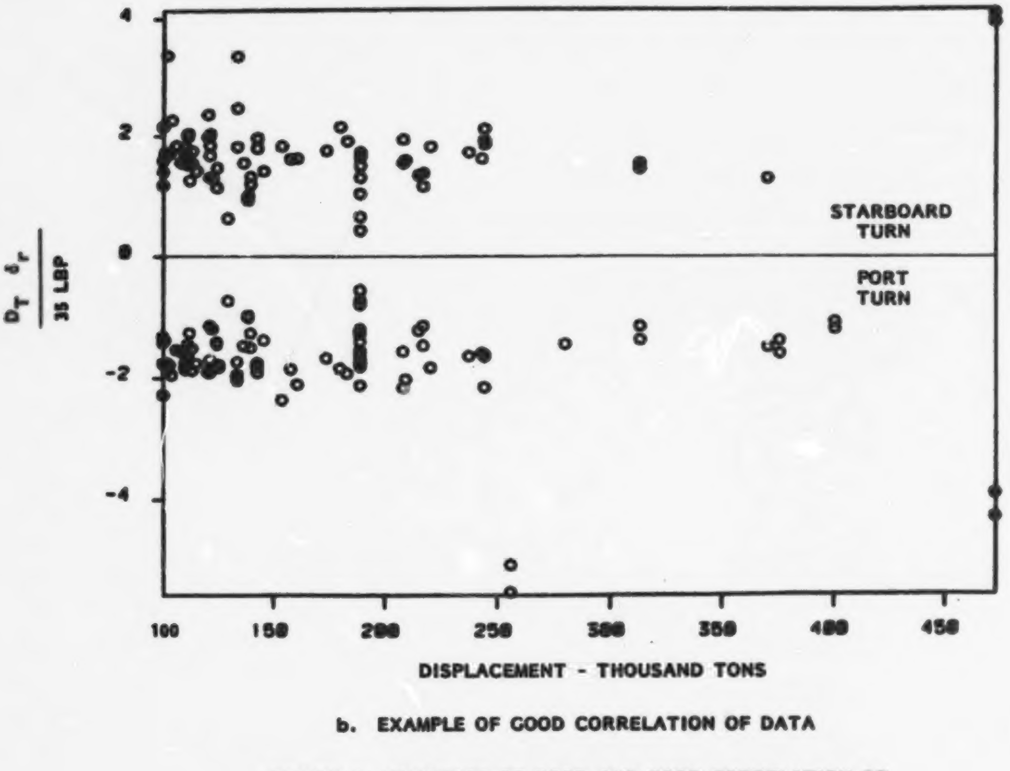


FIGURE 7 - CORRELATION OF ZIG-ZAG MANEUVER PERFORMANCE PARAMETERS K' AND T'



a. EXAMPLE OF POOR CORRELATION OF DATA



b. EXAMPLE OF GOOD CORRELATION OF DATA

FIGURE 8 - EXAMPLES OF GOOD AND POOR CORRELATION OF TURNING MANEUVER PERFORMANCE DATA

to be useful in understanding ship maneuvering performance. In the statistical analyses, the polynomial which best describes the mean of the data was generally determined, and the resulting root mean square or RMS[*] variation of the data about this mean was determined.

A large number of plots were generated for various combinations of data and derived parameters for turning, stopping and zig-zag maneuvers. The purpose in creating these plots was to determine functional relationships between maneuvering performance and ship characteristics. The results of the more useful analyses are discussed in this section.

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[*] See Nomenclature for definition of statistical terms such as RMS.

3.5.3 Turning Maneuvers - Plots were made for various combinations of dimensional and non-dimensional parameters which include advance, transfer and tactical diameters. Some of the parameters used in the non-dimensionalization included LBP, $\nabla^{1/3}$, $(LT)^{\frac{1}{2}}$, rudder angle and rudder area. In some initial plots data for port and starboard turns were segregated, but the results indicate no significant difference in results for these cases. Table 7 describes all of the parametric relationships considered for turns.

The best collapse of all turning data was obtained using displacement in tons and the non-dimensional turning parameters:

$$A' = \frac{A\delta_r}{35\ LBP}$$

$$T'_r = \frac{T_T\delta_r}{35\ LBP}$$

$$D' = \frac{D_T\delta_r}{35\ LBP}$$

where A, T_T, D_T and LBP are advance, transfer, tactical diameter and length between perpendiculars, in meters, and δr is rudder angle in degrees. Because of the large number of turning data, it was first necessary to separately treat data for ships with displacements less than and greater than 100,000 tons.

Figures 9, 10 and 11 show the non-dimensional turning parameters plotted versus ship displacement. A modest scatter of the data is evident in all figures. Statistical analysis of these data indicate that a linear curve fit (a + bx) gives the fit for all turning data. Advance is nearly independent of displacement and can be suitably approximated by

$$A' = 3.1$$

Transfer and tactical diameter, on the other hand, show a modest dependence on displacement.

There are various possible reasons for the data scatter, including

TABLE 7

Parametric Relationships Considered for Ship Turning Maneuvers

$$\frac{A}{L}, \frac{T_T}{L}, \frac{D_T}{L} \text{ versus } \Delta$$

$$\frac{A}{\Delta^{1/3}}, \frac{T_T}{\Delta^{1/3}}, \frac{D_T}{\Delta^{1/3}} \text{ versus } \Delta$$

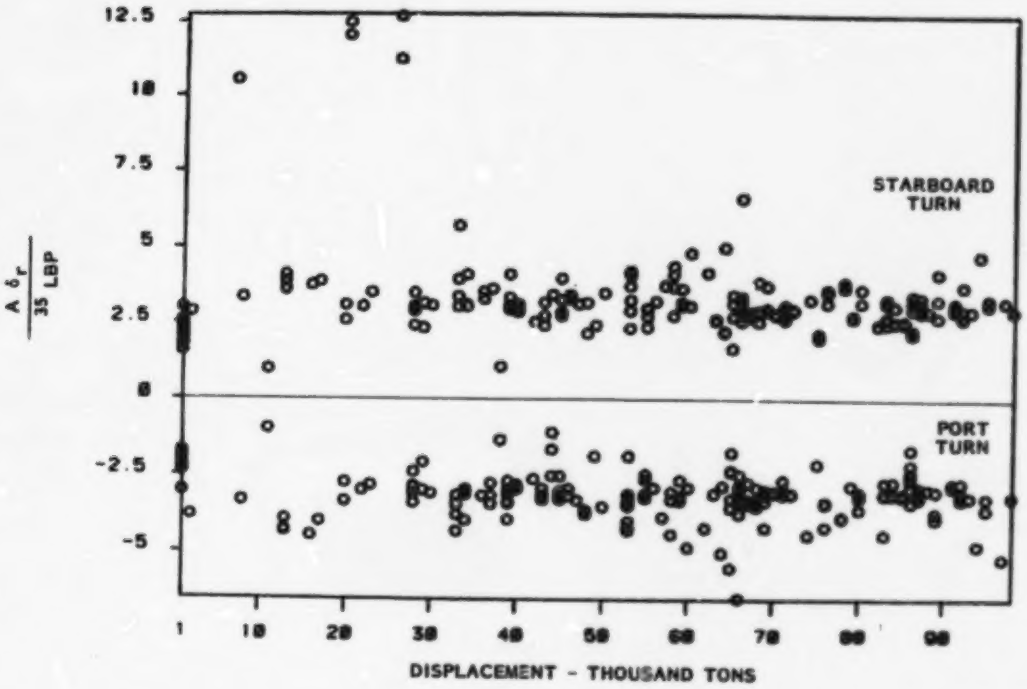
$$\frac{A\,\delta_r}{35\,L}, \frac{T_T\delta_r}{35\,L}, \frac{D_T\delta_r}{35\,L} \text{ versus } \Delta$$

$$\frac{A\,\delta_r}{35(LT)^{1/3}}, \frac{T_T\delta_r}{35(LT)^{1/3}}, \frac{D_T\delta_r}{35(LT)^{1/3}} \text{ versus } \Delta$$

$$\frac{A\,\delta_r\,A_R}{35\,LT^2}, \frac{T_T\delta_r\,A_R}{35\,LT^2}, \frac{D_T\delta_r\,A_R}{35\,LT^2} \text{ versus } \Delta$$

where

A is advance - meters
T_T is transfer - meters
D_T is tactical diameter - meters
L is ship LBP - meters
Δ is displacement (trials) - tons
δ_r is rudder angle - degrees
T is draft - meters
A_R is total rudder area - meters^2



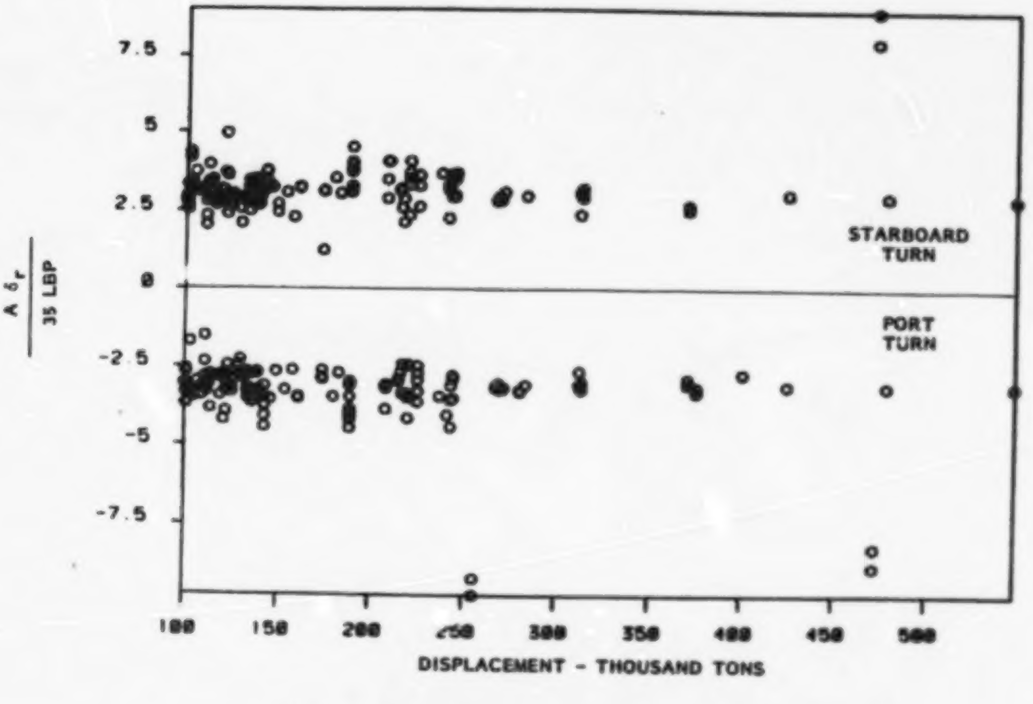


FIGURE 5 - NON-DIMENSIONAL ADVANCE FROM TURNING MANEUVERS FOR ALL VESSELS

BEST DOCUMENT AVAILABLE

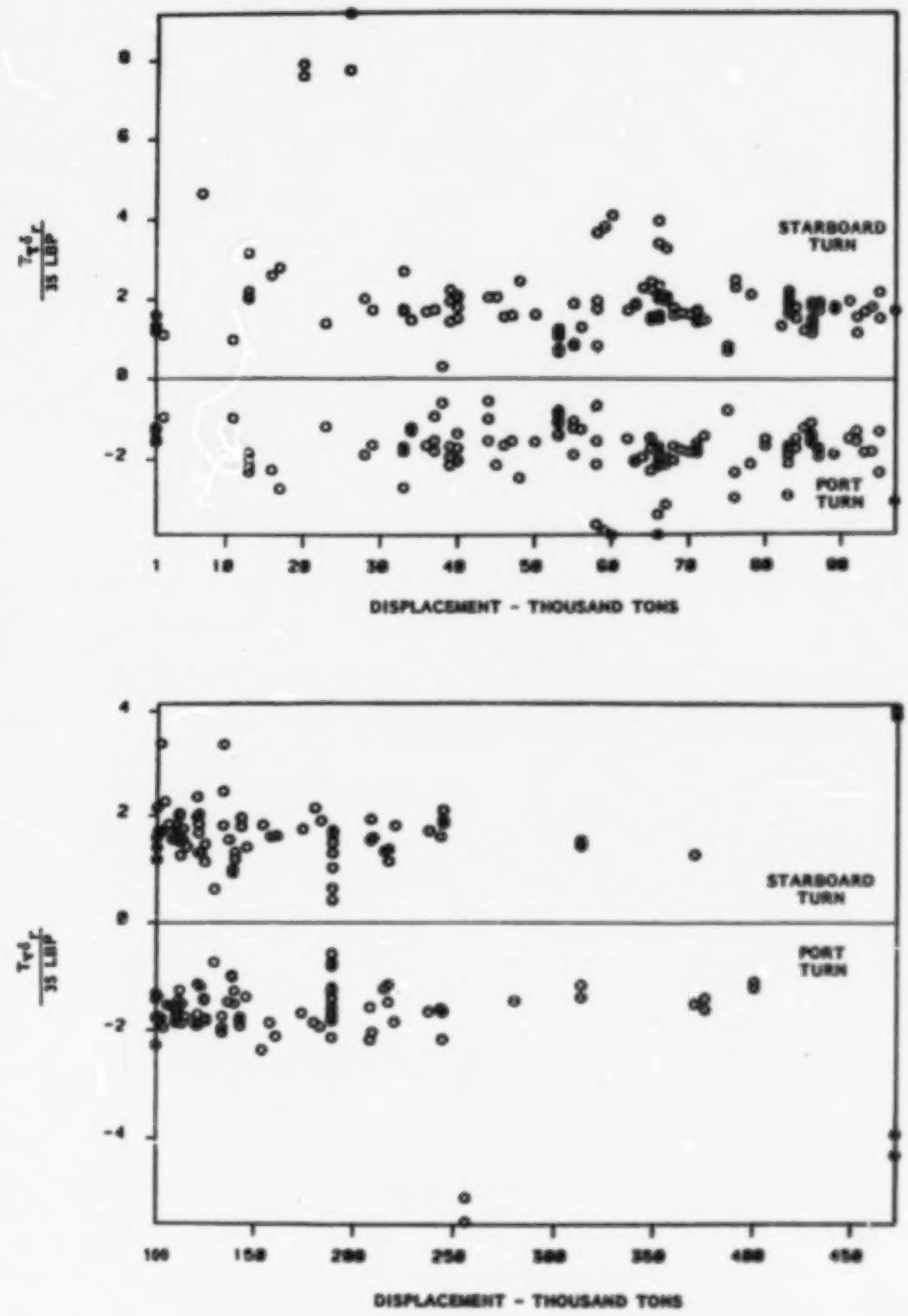


FIGURE 10 - NON-DIMENSIONAL TRANSFER FROM TURNING MANEUVERS FOR ALL VESSELS

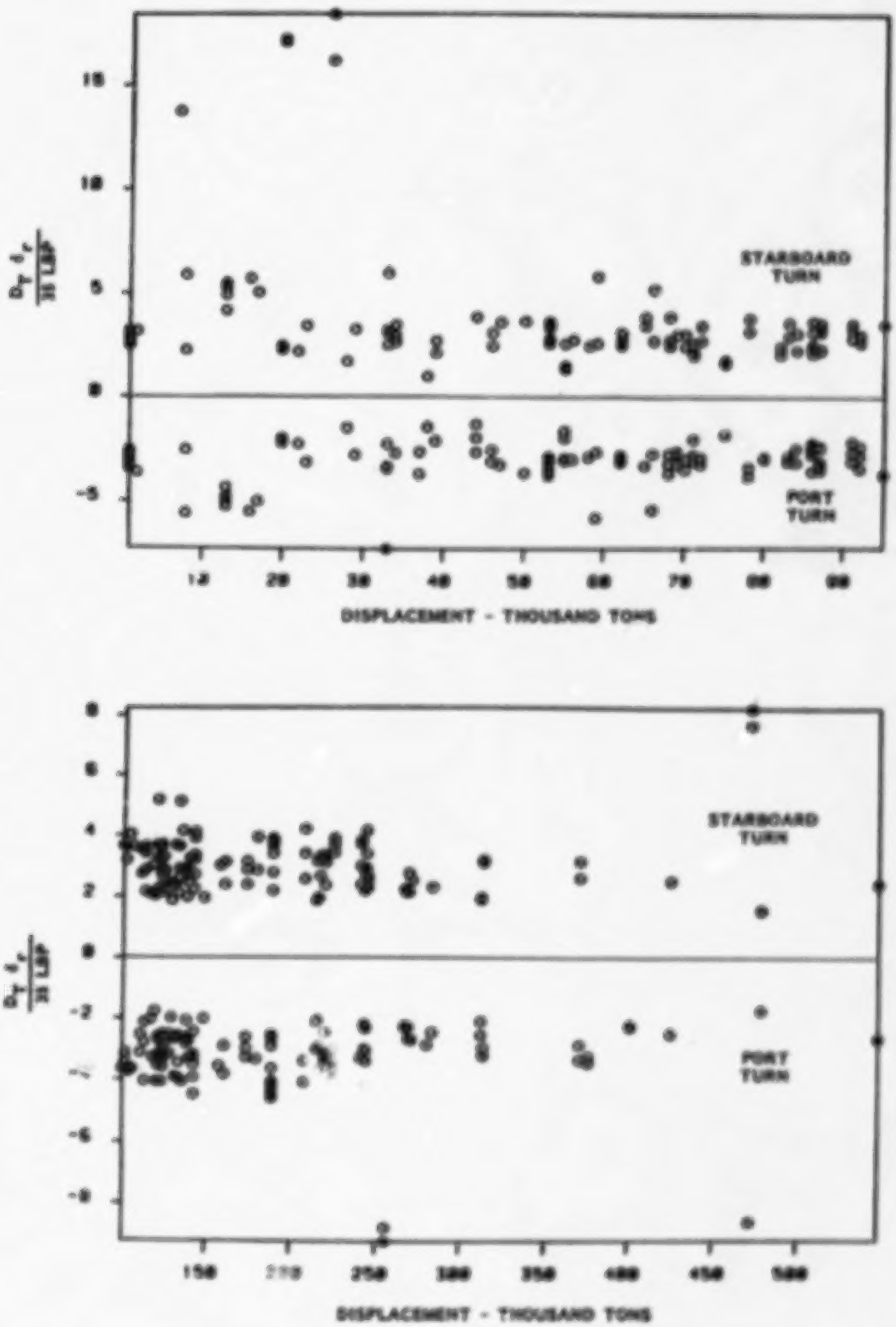


FIGURE 11 - NON-DIMENSIONAL TACTICAL DIAMETER FROM TURNING MANEUVERS FOR ALL VESSELS

the possible impact of the environment during the trials. While individual results may reflect environmental influences, the net effect of environment on results should be minimized by the averaging effect of port and starboard turns and the randomness of such effects in such a large body of data. The curves for T' and D' have a negative slope, a result that is in agreement with the known fact that the proportions and design of smaller ships are generally different than larger ships, such as tankers, and these differences generally make smaller ships more stable and hence harder to turn.

It is clear from the figures and statistical analysis that advance, transfer and tactical diameter are closely related and that only one of these measures is needed to characterize turning performance. Tactical diameter has been selected since it is the most widely used and familiar measure of turning performance. Advance would be an equally good alternative.

Figures 12-14 present non-dimensional tactical diameter, D', for tankers, bulk carriers, and for cargo and container ship, respectively. These are adequate data for statistical analysis only for the first three ship types. Figure 15 and Table 8 compares the least-squares fit[*] mean curves to the data of Figures 11-14. The results for all ships, for, tankers, which are primarily larger than 100,000 tons, and for bulk carriers, which are primarily smaller than 100,000 tons, are quite similar. The results for cargo ships are generally higher but the differences are only about 15 percent. It is therefore concluded that the results for "all ships" are typical and it is appropriate to use these results as a basis for proposed standards for all ships.

These results provide a good benchmark for assessing the turning ability of any ship. However the relationship between turning capability and inherent ship maneuverability cannot be established from these figures alone, since turning ability is only one factor which determine ship maneuverability or controllability.

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[*] See Nomenclature for definition

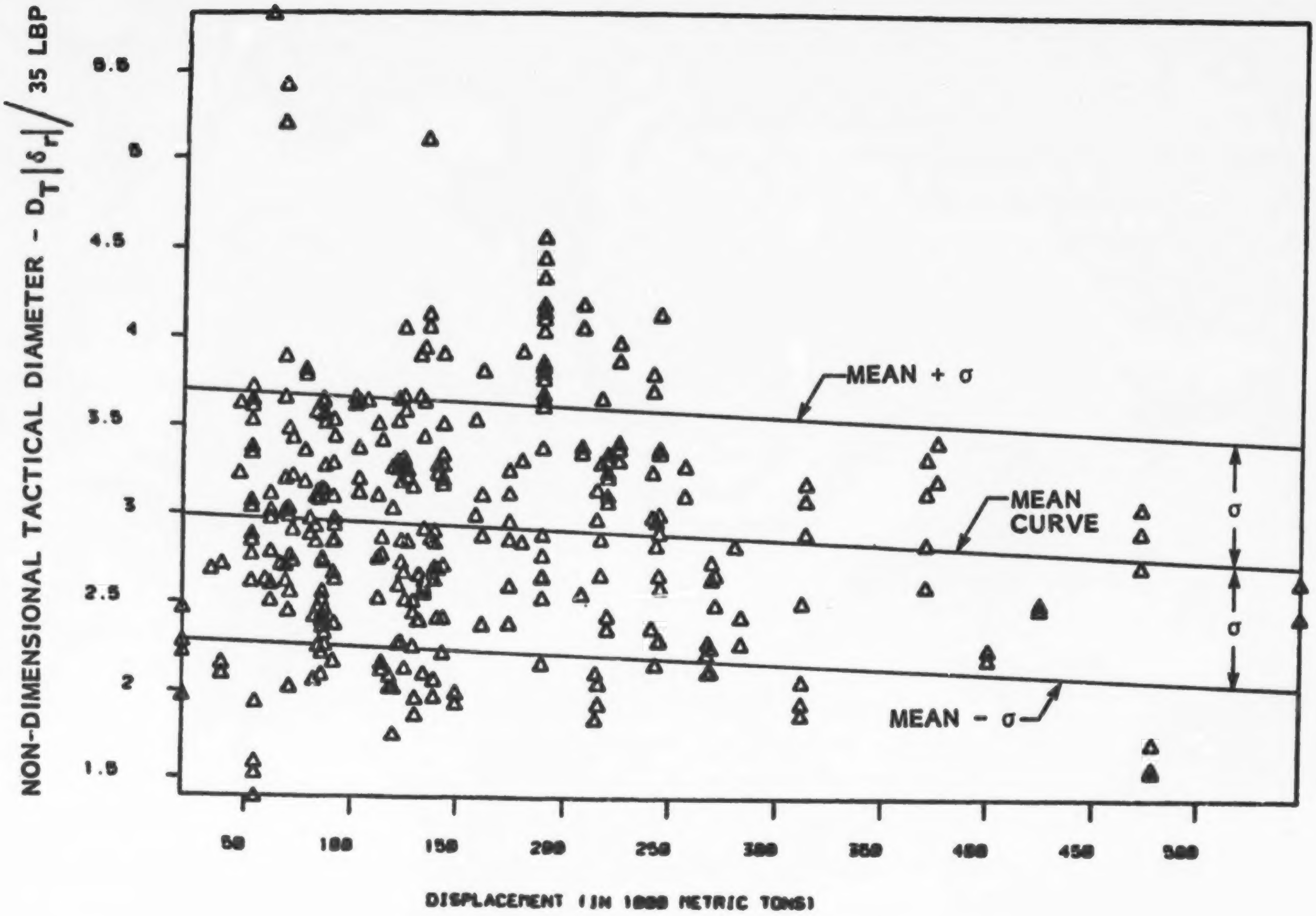


FIGURE 12 - TACTICAL DIAMETER DATA AND ANALYSIS FOR ALL TANKERS

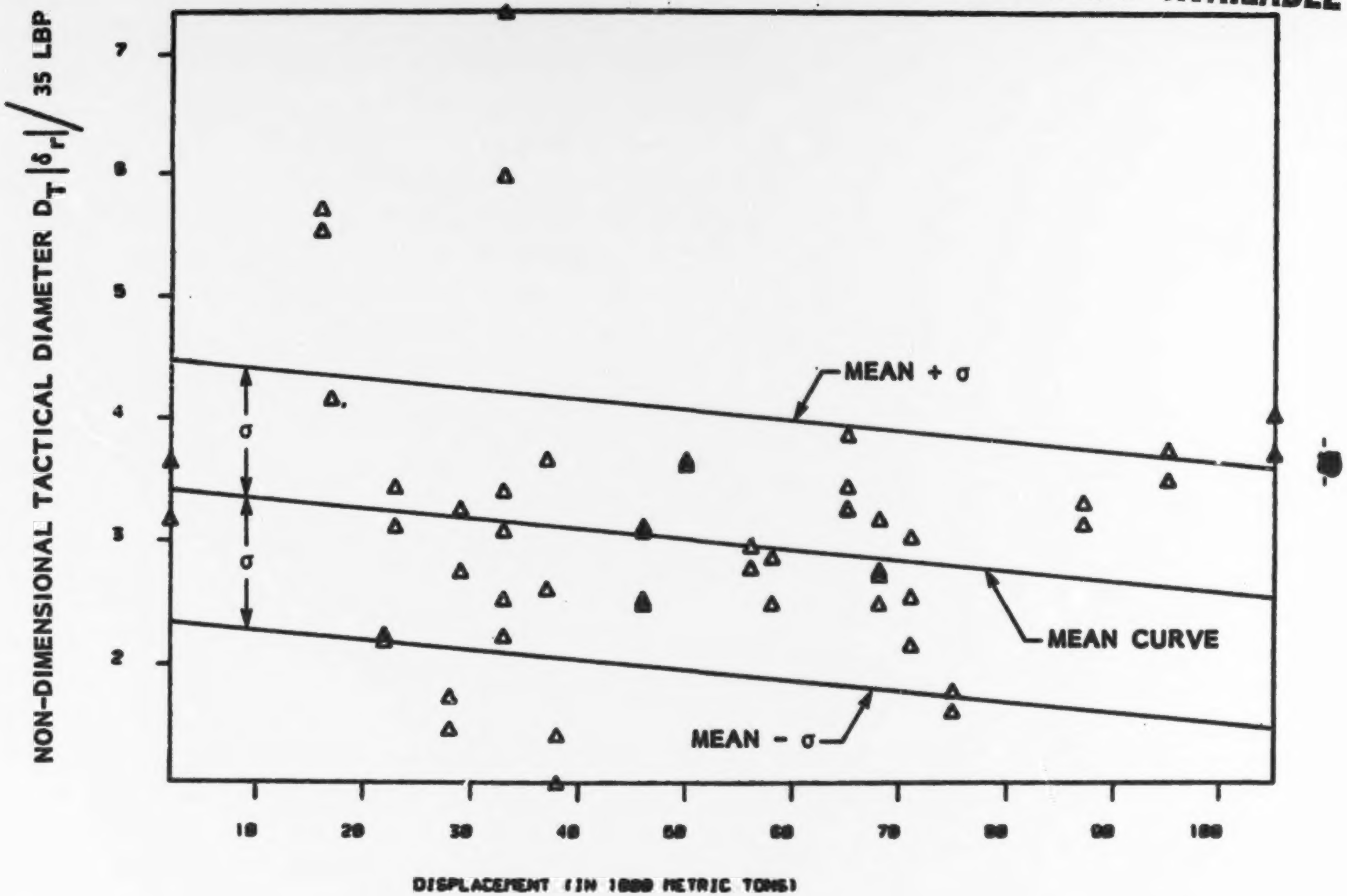


FIGURE 13 - TACTICAL DIAMETER DATA AND ANALYSIS FOR BULK CARRIERS

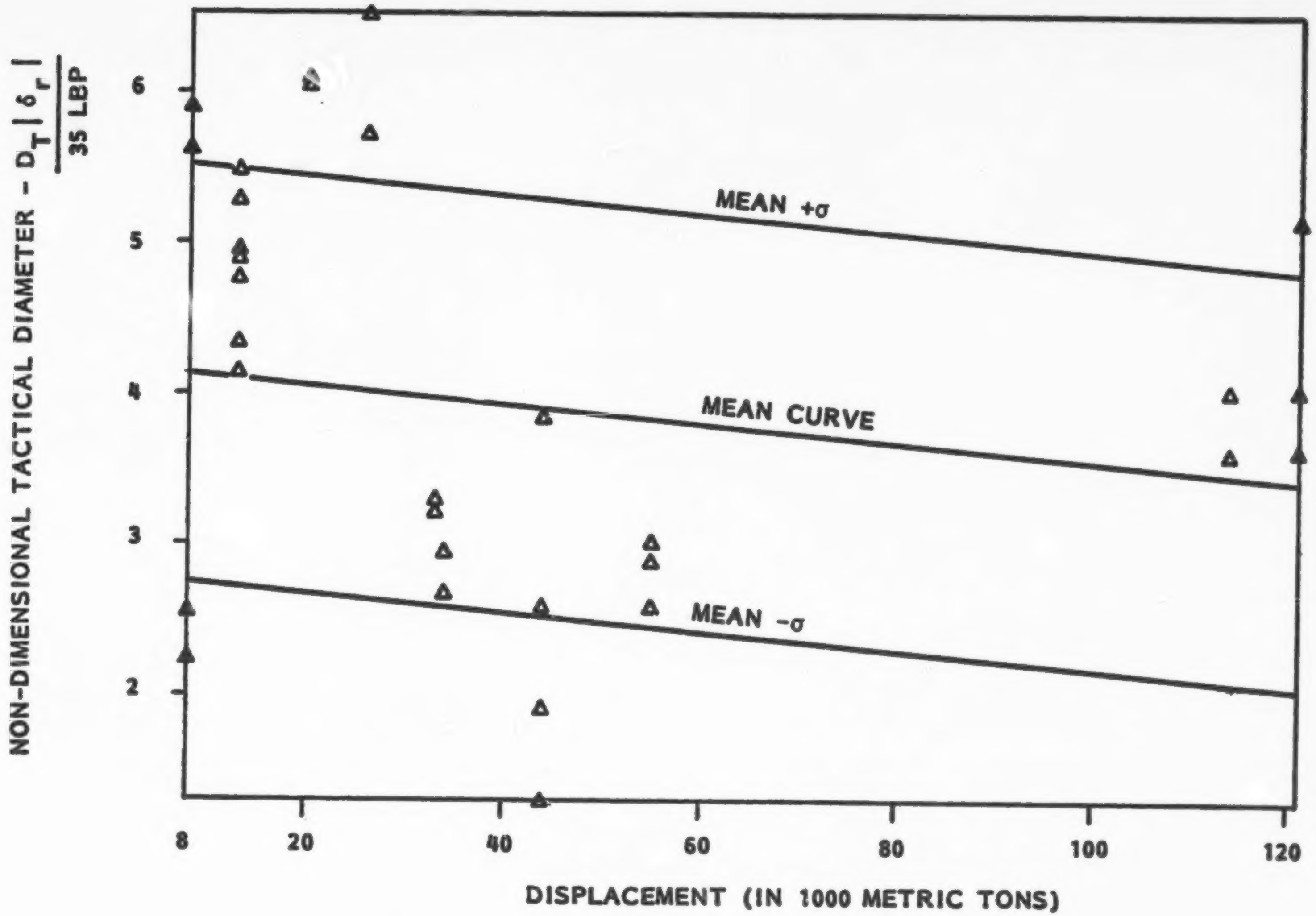
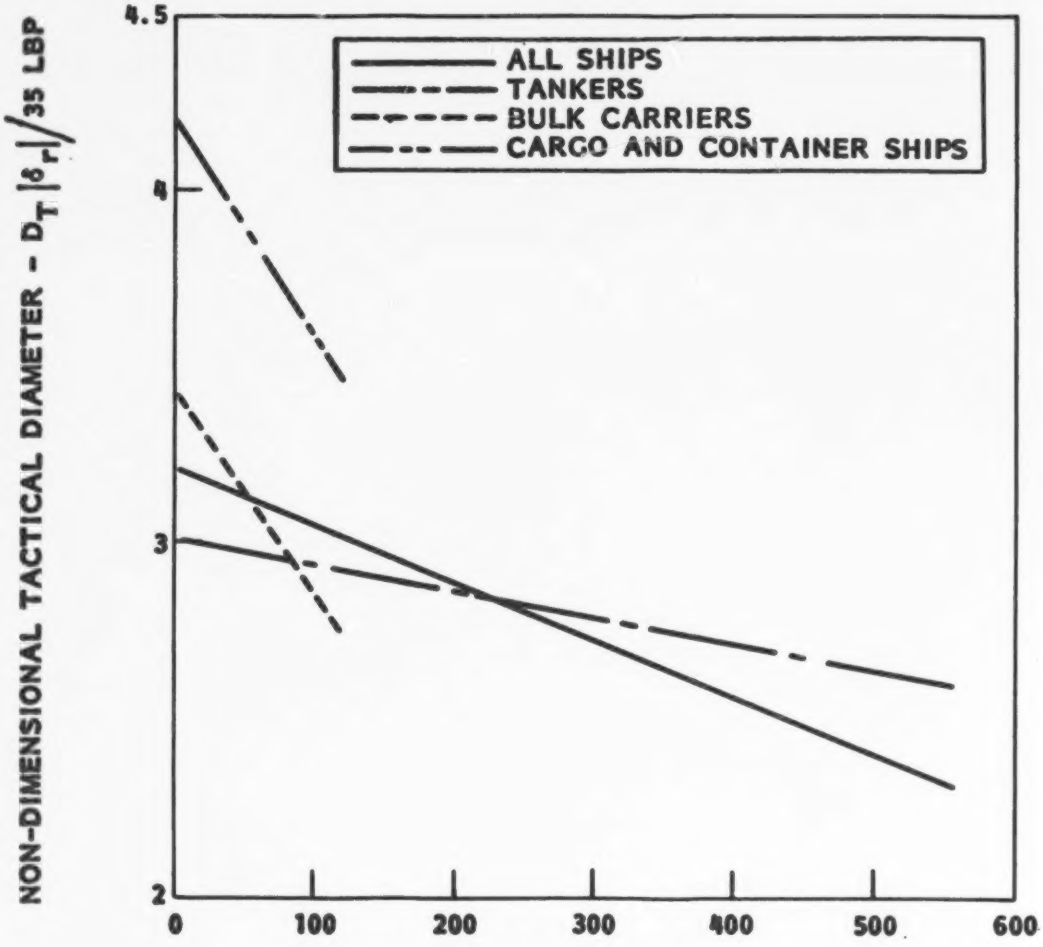


FIGURE 14 - NON-DIMENSIONAL TACTICAL DIAMETERS FOR CARGO AND CONTAINER SHIPS



DISPLACEMENT - 1000 METRIC TONS

FIGURE 15 - FIRST ORDER, LEAST SQUARES FITS TO TACTICAL DIAMETER TRIALS DATA

TABLE 8

Summary of Statistics for Tactical Diameter

Ship Type	Number of Maneuvers	Mean Curve D_m'	Standard Deviation σ_D
All Ships	483	$3.21 - 1.62 \times 10^{-6}\Delta^{**}$	0.84
Tankers	373	$3.03 - 0.87 \times 10^{-6}\Delta$	0.67
Bulk Carriers	56	$3.32 - 4.61 \times 10^{-6}\Delta$	1.12
Cargo Ships	29	$3.72 - 2.05 \times 10^{-6}\Delta$	1.25
Container Ships	6	$2.58 + 148 \times 10^{-6}\Delta^{*}$	0.45
Other Ships	19	$2.65 + 31.4 \times 10^{-6}\Delta^{*}$	0.27

Δ is ship displacement in metric tons

* These results are not based on sufficient data to be considered meaningful.

** This relationship is not particularly meaningful since combined effect of all ships should be used for comparison only.

Figure 16 indicates that approximately 12 percent of all data points for 483 ships fall above the mean curve plus one standard deviation and approximately 10 percent of data points fall below the mean curve minus one standard deviation. Approximately nine percent of data points fall above the mean curve plus 1.25 standard deviations and approximately five percent of data points fall below the mean curve minus 1.25 standard deviations. Based on these distributions and the results for the 80,000 DWT tanker, as described in Section 3.4, turning performance ratings have been selected as follows:

Rating	Upper Limit	Lower Limit	% of Data
Superior	$D_m'-1.25\ \sigma_D$	-	5
Above Average	$D_m'-0.5\ \sigma_D$	$D_m'-1.25\ \sigma_D$	25
Average	$D_m'+0.5\ \sigma_D$	$D_m'-0.5\ \sigma_D$	41
Below Average	$D_m'+1.25\ \sigma_D$	$D_m'+0.5\ \sigma_D$	20
Marginal	-	$D_m'+1.25$	9

Where D_m' is the mean value of D' at the given ship displacement and σ_D is the significant value of D'.

The original 80,000 DWT tanker discussed in Section 3.4 has an average rating while the degraded ship of reduced rudder effectiveness has a marginal rating, one which seems appropriate to its relatively low probability of success.

3.5.4 Crash Stopping Maneuvers - Stopping data are available for 360 ships or for about 60 percent of the ships in the data base. Available data typically include head reach and stopping time. In some cases transfer or side reach and final heading are also available, but these were considered to be of lesser interest.

Based on various analyses of the dynamics of ship stopping, a number of non-dimensional parameters were considered for analysis of stopping data. Both non-dimensional head reach and time and non-dimensional speed-power parameters were considered, including:

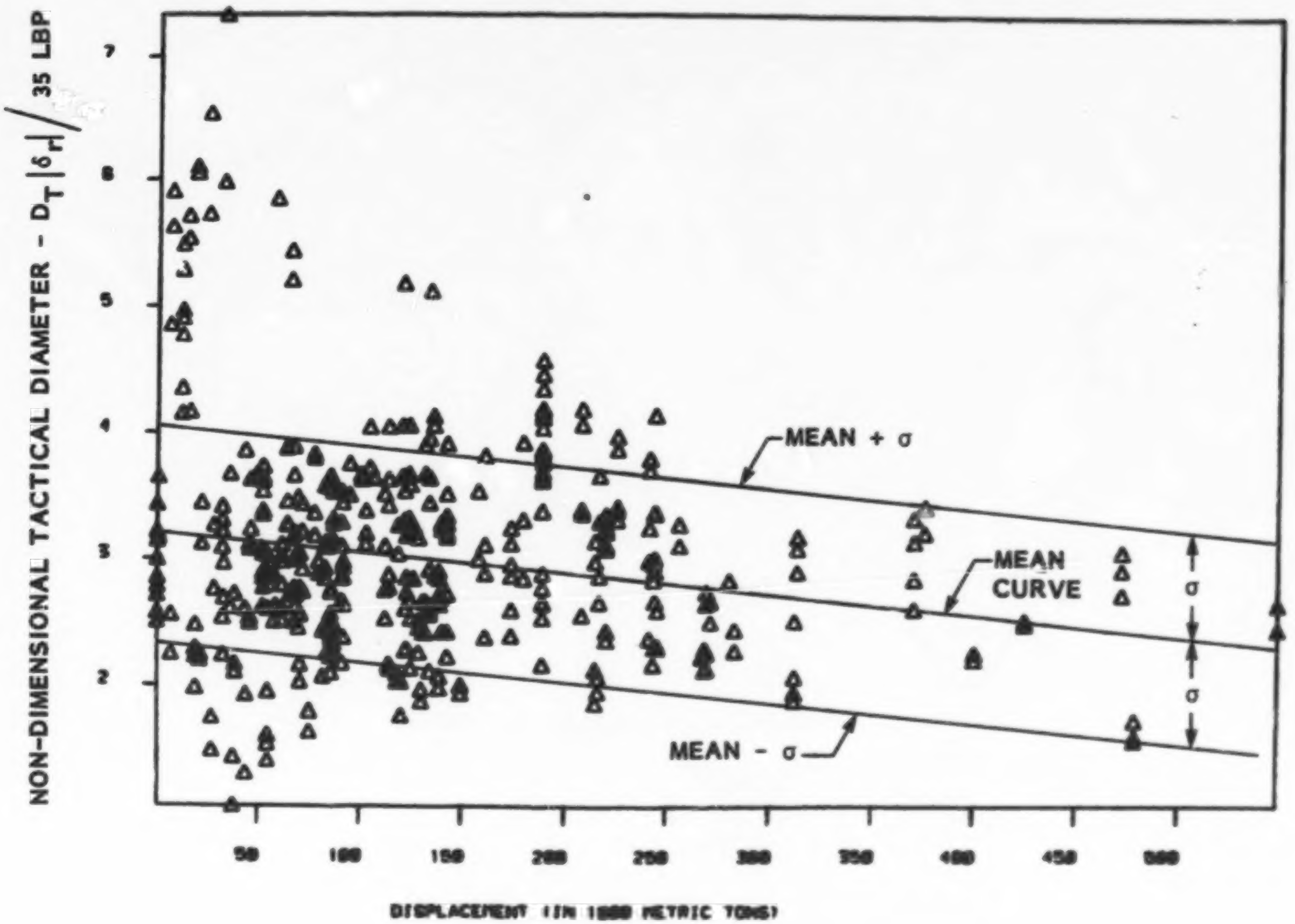


FIGURE 16 - TACTICAL DIAMETER DATA AND ANALYSIS FOR ALL SHIPS

$$\frac{S}{\Delta^{1/3}}, \quad \frac{t\,Vo}{\Delta^{1/3}}, \quad \frac{Vo^3\Delta}{HP_a\,D_p}, \quad \frac{Vo^3\,\Delta^{2/3}}{HP_a}$$

where S is head reach, t is time to stop, Vo is initial speed, HP_a is maximum astern horsepower and D_p is propeller diameter. The third parameter is based on the work of Clarke (1970), while the last parameter is similar except that propeller diameter, which is not known for many ships in the data base, was eliminated. Table 9 describes all of the parametric relationships considered for crash stops. Analysis of crash stop trials data currently provides the only practical basis for evaluating and rating the stopping performance of a ship. Crash stopping data for all ships in the data base have been analyzed and, in addition, data have been analyzed for the individual ship types and primary machinery/propeller types (steam turbine/fixed pitch propeller and diesel/fixed pitch propeller). Inadequate data exist in the data base for useful statistical analysis of other machinery/propeller types.

Various approaches were considered for analyzing crash stop data as described in Table 9. Most of these approaches used non-dimensional or dimensional head reach parameters which included propeller diameter and/or astern power as well as initial ship speed. Parameters which incorporate power or propeller diameter more correctly represent a stopping efficiency (relative to design capability) rather than an absolute stopping ability. After considering various head reach parameters, it was found that the non-dimensional parameter

$$\frac{R_h}{LBP} \times \frac{1}{F} = R'$$

where R_h, LBP and F are head reach (meters), length between perpendiculars (meters) and initial speed Froude number $(V/\sqrt{g\,LBP})$,[*] provided a good collapse of the complete set of data when plotted versus ship displacement.

Table 10 presents results of the statistical analysis of crash stopping data for all ships and for tankers and bulk carriers, and cargo ships. This

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[*] g = 9.80665 m per sec per sec , and divide speed (in knots) by 1.94 to obtain speed in m/sec.

TABLE 9

Parametric Relationships Considered for Ship Crash Stopping Maneuvers

$$\frac{R_h}{\Delta^{1/3}}\ ,\ \frac{t_s\ V_a}{\Delta^{1/3}}\ \text{versus}\ \Delta$$

$$\frac{R_h}{\Delta^{1/3}}\ ,\ \frac{t_s\ V_a}{\Delta^{1/3}}\ \text{versus}\ \frac{V_a^3\ \Delta}{HP_a\ D_p}$$

$$\frac{R_h}{\Delta^{1/3}}\ ,\ \frac{t_s\ V_a}{\Delta^{1/3}}\ \text{versus}\ \frac{V_a^3\ \Delta^{2/3}}{HP_a}$$

$$\frac{R_h\ HP_a}{V_a^3\ D_p}\ ,\ \frac{t_s\ HP_a}{V_a^3\ D_p}\ \text{versus}\ \Delta$$

$$V_a\ t_s\ \text{versus}\ R_h$$

$$\frac{R_h}{F\ L}\ \text{versus}\ \Delta$$

where

R_h is head reach - meters

t_s is stopping time - seconds

V_a is approach speed - knots

D_p is propeller diameter - meters

HP_a is astern maximum horsepower

Δ is displacement in metric tons

L is ship LBP

F is Froude number

TABLE 10

Summary of Statistics for Head Reach /100.

Ship Type		Number of Maneuvers	Mean Curve R_m'	Standard Deviation σ_R
By Ship Type	All Ships	342	$0.24 + 0.077 \times 10^{-5}\Delta$*	0.146
	Tankers	268	$0.26 + 0.065 \times 10^{-5}\Delta$	0.158
	Bulk Carriers	68	$0.15 + 0.20 \times 10^{-5}\Delta$	0.083
	Cargo Ships	6	$0.18 + 0.20 \times 10^{-5}\Delta$	0.052
By Machinery Type	Steam Turbine**	213	$0.23 + 0.087 \times 10^{-5}\Delta$	0.160
	Diesels**	134	$0.21 + 0.119 \times 10^{-5}\Delta$	0.096
	Other Engine/ Propeller Types	13	$0.17 + 0.124 \times 10^{-5}\Delta$	0.096

* Δ is displacement in metric tons

** With fixed pitch propellers only

table shows the linear curve fits obtained from a least squares fit to the data and the standard (RMS) deviation of all data from this mean curve. Insufficient data were available for making any statisitcal analysis for other ship types.

It can be seen from Table 10 and from Figure 17 that there are no large differences in the results for different ship types and sizes. Although the data for ships of less than 100,000 tons displacement indicate a slight tendency of the curve to bend downward at low displacement. The mean curve for "all ships" is considered representative and it was therefore decided to use deviations from this mean curve to define stopping performance ratings for all ship types.

Table 10 presents results of the statistical analysis of crash stopping for all ships and for ships with steam turbine/fixed pitch propeller and diesel/fixed pitch propeller propulsion systems. Results for the two machinery/propeller types and for "all ships" are similar, although head reaches for the largest diesel powered ships are as much as 25 percent larger than the values for "all ships." This large difference undoubtedly reflects the limited number of very large ships identified as having diesel power. It should be noted that the statistical analysis by ship type does not indicate any of the ships for which the machinery type is unknown. Based on the results shown in Table 10 and Figure 18 it is concluded that the curve fit for "all ship" is typical of all results for all ship types and propulsion types, except, perhaps, for large diesel powered ships. It is therefore proposed to use the result for "all ships" as a basis for the proposed standards for any ship/machinery type.

Figure 19 shows the mean curve for all data and this mean curve plus and minus one standard deviation superimposed on the data plot. This figure indicates that approximately three percent of all data points lie above the mean plus one standard deviation curve, 10 percent of points lie above the mean plus 0.75 standard deviation curve, and approximately five percent of points lie below the mean minus one standard deviation curve. It therefore seems appropriate to define stopping performance ratings as follows:

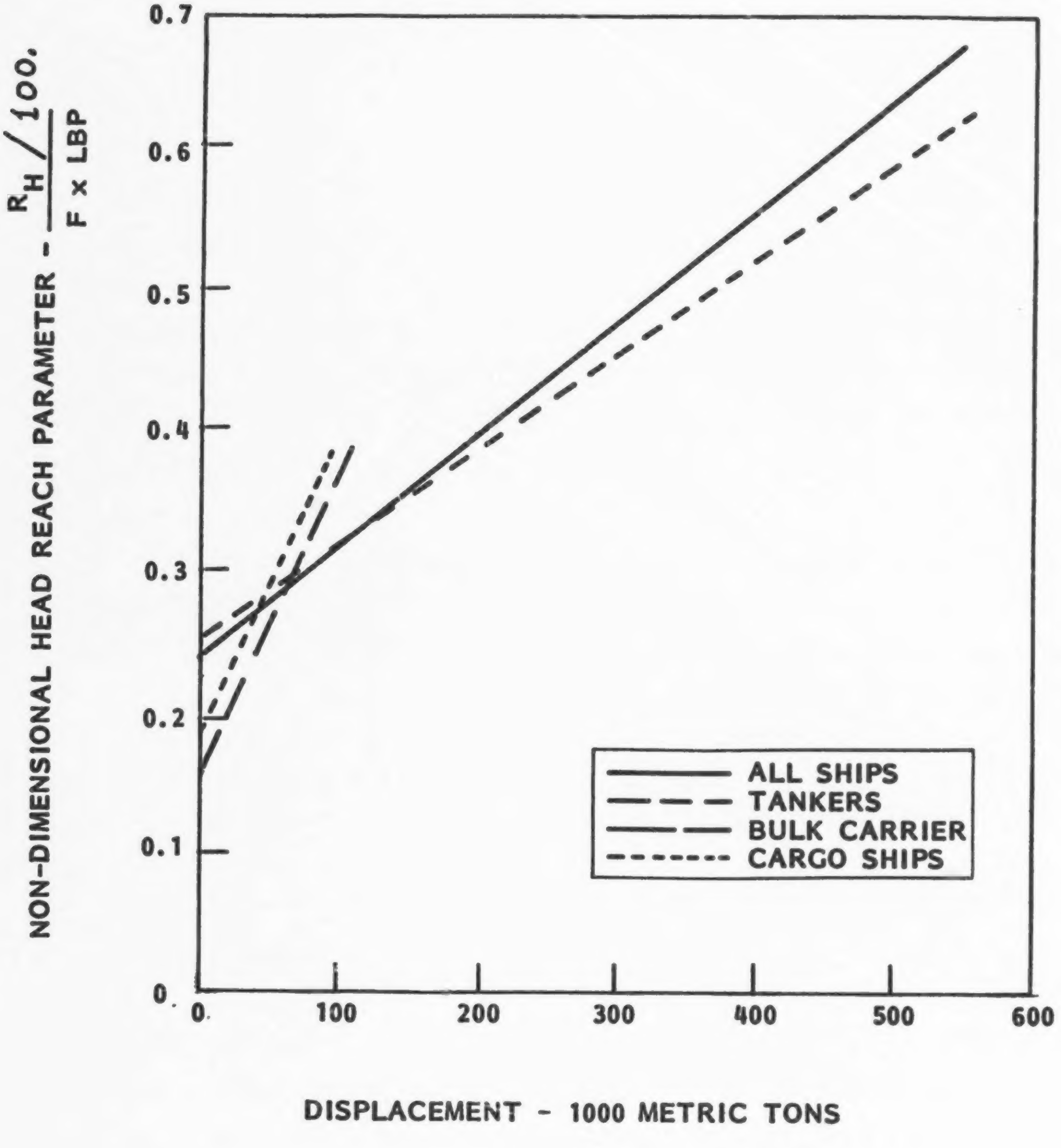
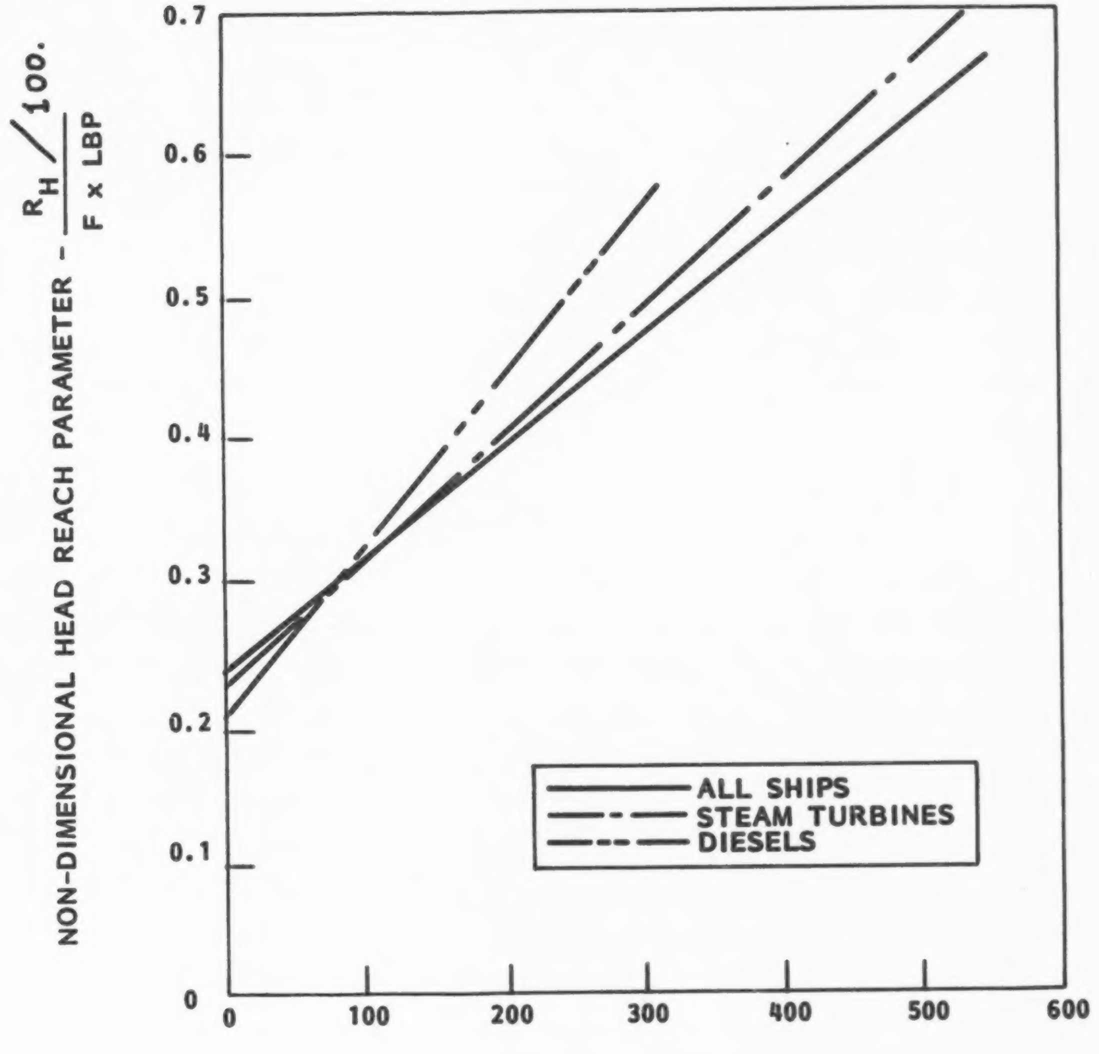


FIGURE 17 - FIRST ORDER, LEAST SQUARES FITS TO TRIALS HEAD REACH DATA FOR VARYING SHIP TYPE



DISPLACEMENT - 1000 METRIC TONS

FIGURE 18 - FIRST ORDER, LEAST SQUARES FITS TO TRIALS HEAD REACH DATA FOR VARYING MACHINERY TYPE

BEST DOCUMENT AVAILABLE

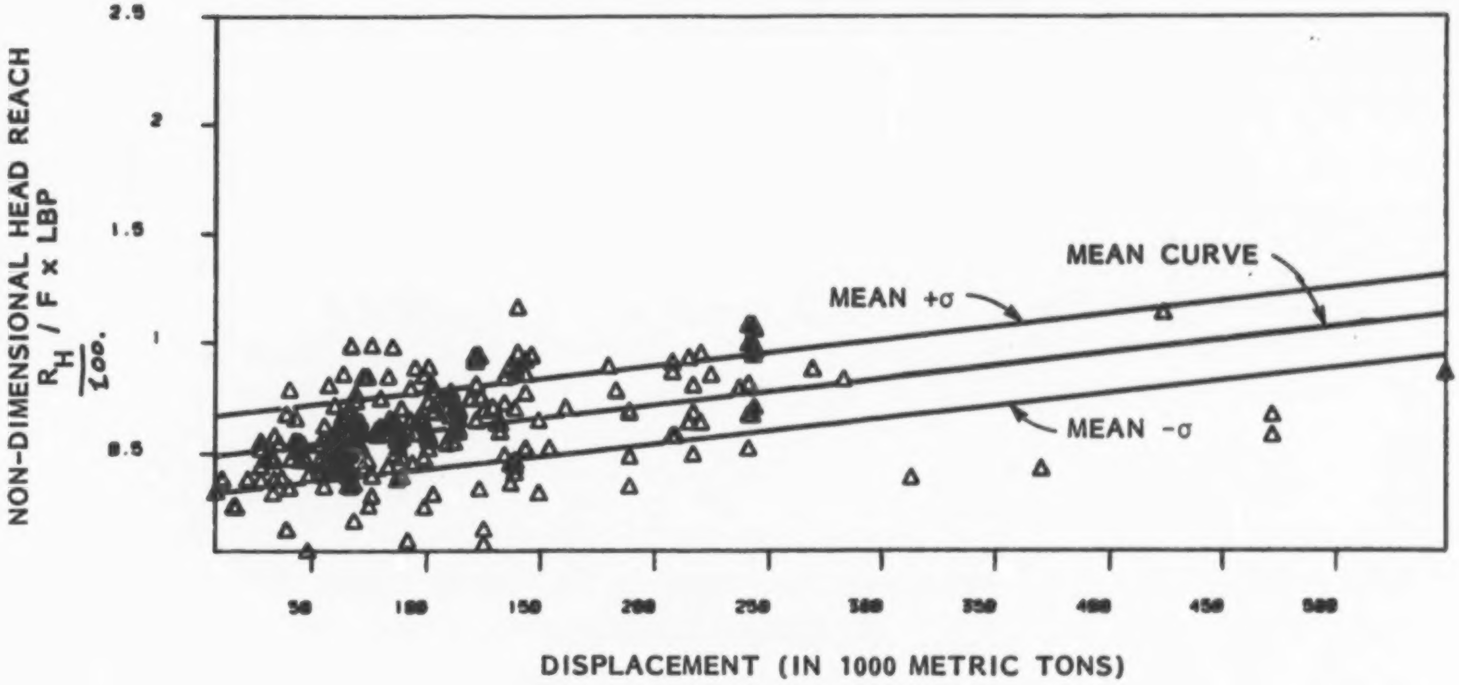


FIGURE 19 - STOPPING HEAD REACH DATA AND ANALYSIS FOR ALL SHIPS

Level	Upper Limit	Lower Limit	% of Data
Superior	$R_m' - \sigma_R'$	-	7
Above Average	$R_m'-0.5\ \sigma_R$	$R_m'-\sigma_R'$	20
Average	$R_m'+0.5\ \sigma_R'$	$R_m'-0.5\ \sigma_R'$	50
Below Average	$R_m'+\sigma_R'$	$R_m'+0.5\ \sigma_R'$	18
Marginal	-	$R_m'+\sigma_R'$	5

Where R_m' is the mean value of the non-dimensional head reach parameter, R', and σ_R' is the significant or RMS value of R'. The distribution of data by performance level is similar to that for other measures of performance discussed in this section.

3.5.5 Zig-Zag Maneuvers - Information on zig-zag maneuvers is much more limited than data on turning and stopping. Zig-zag data were available for about 100 ships in the data base. Attempts were made, as outlined in Table 11, to correlate overshoot angle with ship displacement, block coefficient and the parameter:

$$\frac{\Delta}{LBP\ T^2}$$

where T is ship draft. Results are shown in Figures 20-22. Overshoot angles were non-dimensionalized by rudder angle to permit comparison of results for different zig-zag maneuvers (20-20 and 10-10 zig-zags, for example):

$$\delta' = \frac{\text{overshoot angle}}{\text{rudder angle}} = \frac{\delta_o}{\delta_r}$$

No clear trend of overshoot angle with ship displacement is evident from Figure 20, although there appears to be a clear increase in overshoot angle for displacements less than 150,000 tons. Figure 21 indicates that there is no definable trend of overshoot angle with the parameter $\Delta/LBT \times T^2$ which was taken from previous analyses of zig-zag data, Della Logia, et al., (1975).

TABLE 11

Parametric Relationships Considered for Ship Zig-Zag Maneuvers

$$\frac{\delta_1}{\delta_r}, \frac{\delta_2}{\delta_r} \text{ versus } \Delta$$

$$\frac{\delta_1}{\delta_r}, \frac{\delta_2}{\delta_r} \text{ versus } C_B$$

$$\frac{\delta_1}{\delta_r}, \frac{\delta_2}{\delta_r} \text{ versus } F$$

$$\frac{20\ \delta_1}{F\ \delta_r}, \frac{20\ \delta_2}{F\ \delta_r} \text{ versus } C_B$$

$$\frac{20\ \delta_1}{\delta r}, \frac{20\ \delta_2}{\delta r} \text{ versus } \frac{\Delta}{LT^2}$$

$$\frac{1}{K'} \text{ versus } \frac{1}{T'}$$

$$\frac{A_R\ L}{K'\ \nabla} \text{ versus } \frac{1}{T'}$$

where

δ_1 is first overshoot angle - degrees

δ_2 is final overshoot angle - degrees

δ_r is rudder angle - degrees

F is Froude Number

C_B is block coefficient

A_R is rudder area

K' and T' are Nomoto-Norrbin parameters (see Appendix G)

Δ is displacement - tons

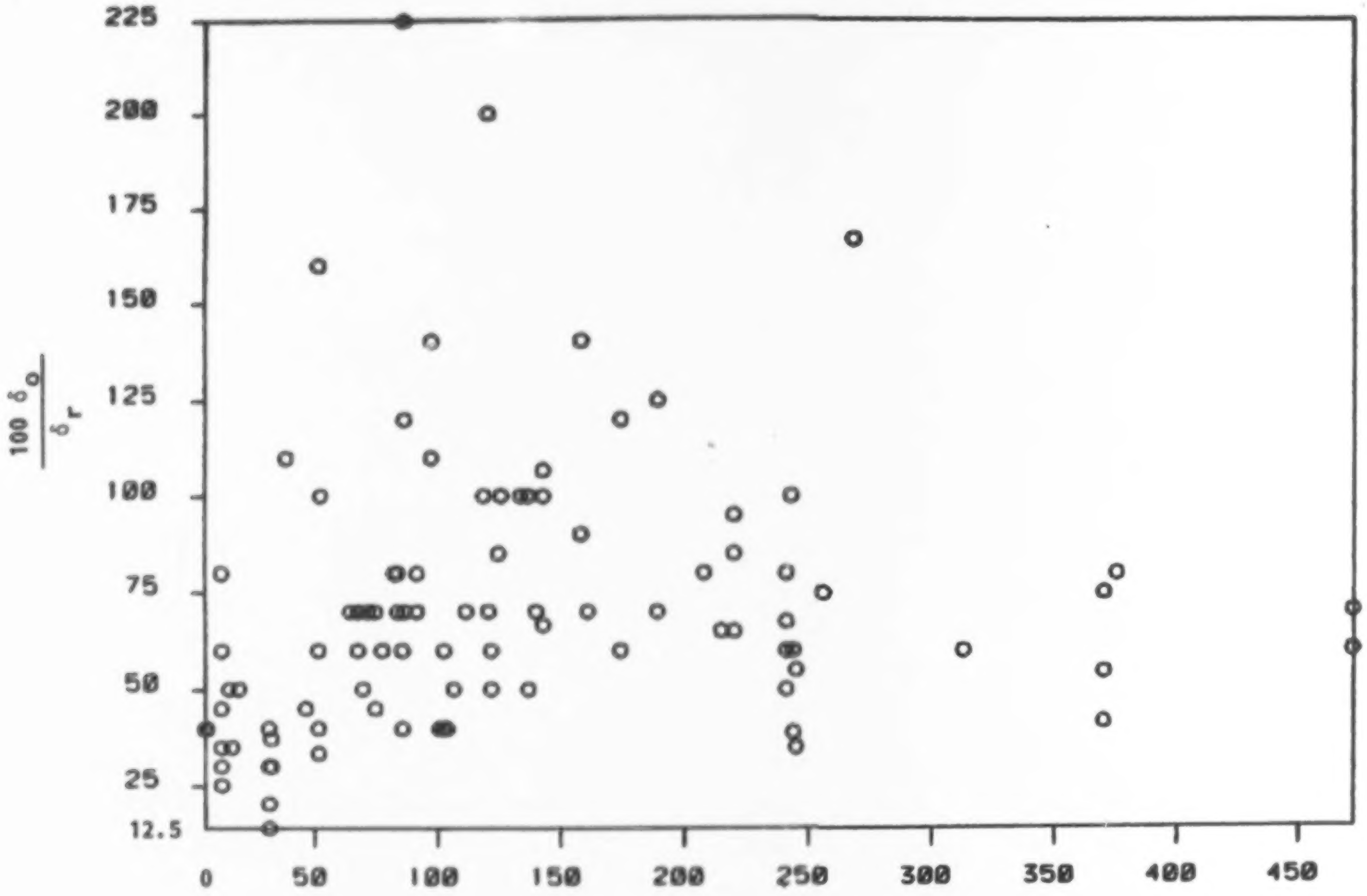


FIGURE 20 - NON-DIMENSIONAL OVERSHOOT ANGLES FROM ZIG-ZAG MANEUVERS

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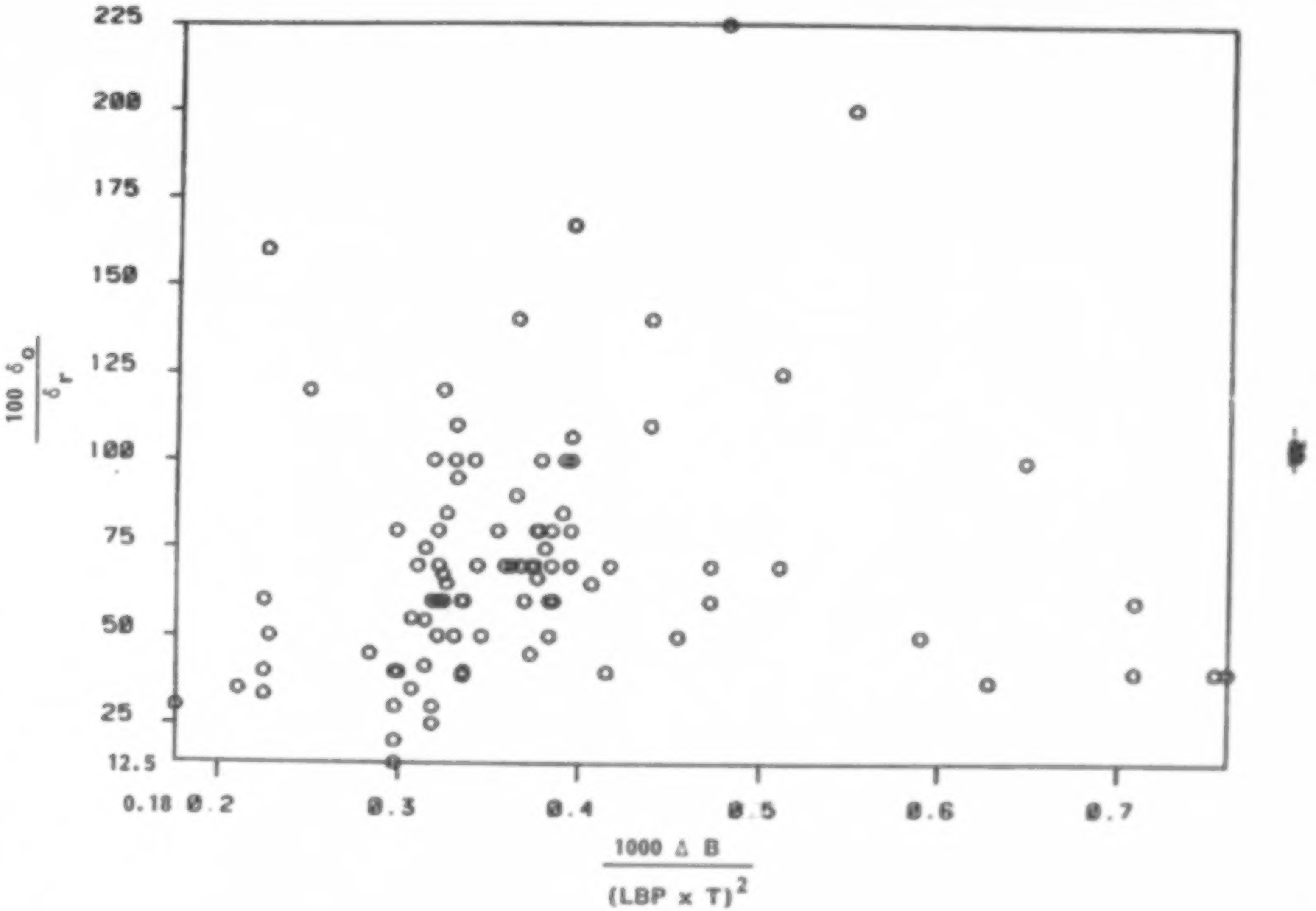

FIGURE 21 - NON-DIMENSIONAL OVERSHOOT ANGLES FROM ZIG-ZAG MANEUVERS

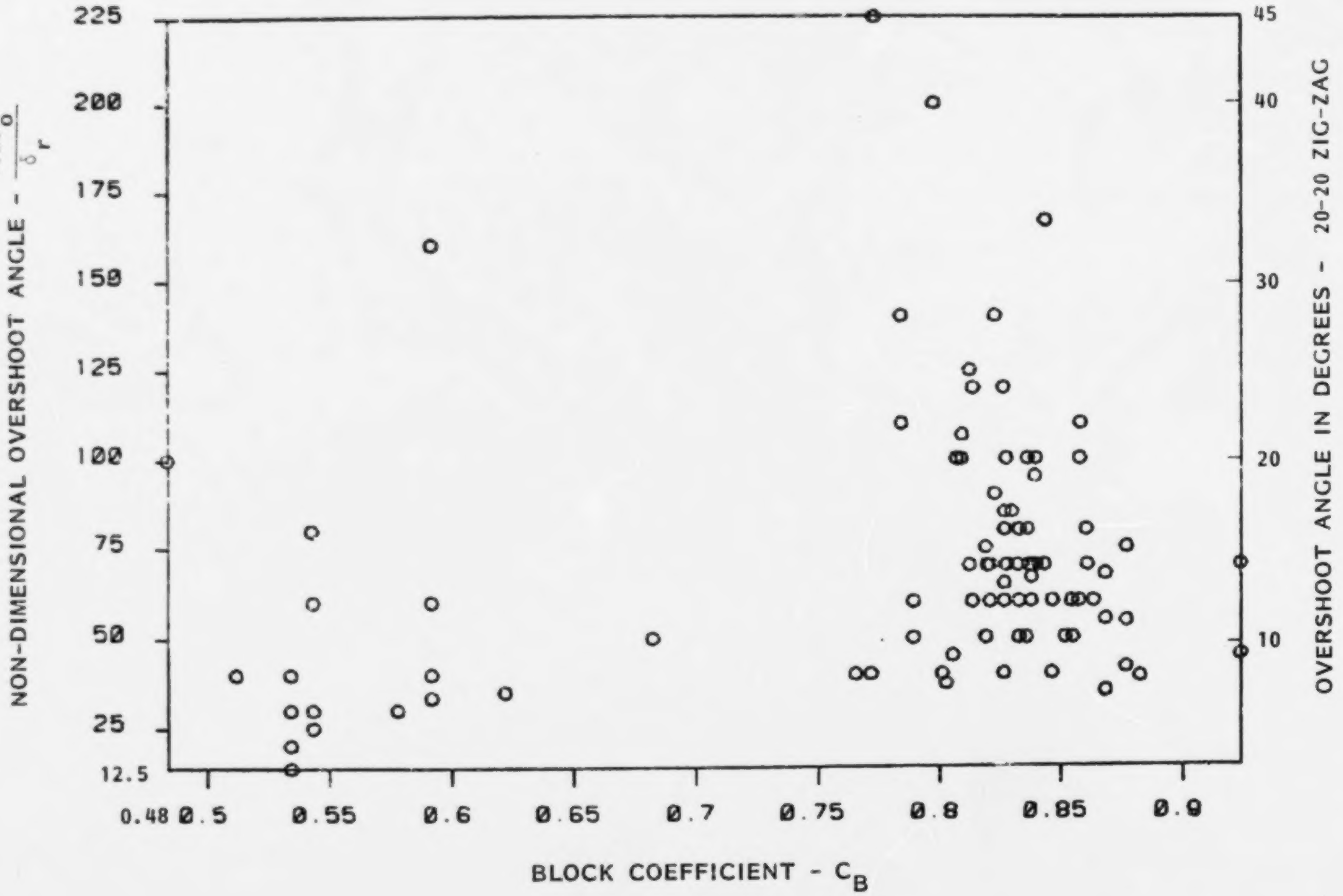

FIGURE 22 - NON-DIMENSIONAL OVERSHOOT ANGLES FROM ZIG-ZAG MANEUVERS

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The results of Figure 22, where overshoot angle is plotted as a function of block coefficient, indicate existence of correlation if the results for finer ships ($C_B < 0.7$) and fuller ships ($C_B > 0.7$) are considered separately. It appears that a characteristic or mean non-dimensional overshoot angle, δ', can be separately defined for these two groups of ships. The mean values and standard deviations for these ship may be useful for evaluating zig-zag performance and ship maneuvering performance. It should be noted, however, that available data for $C_B < 0.7$ are quite limited.

It is not surprising that the fuller ships, which are primarily tankers and bulk carriers, have larger overshoot angles than the finer ships. The largest overshoot angle is for an LNG ship which is well known for its poor handling characteristics.

Figure 23 shows δ' plotted versus C_B for individual ship types. Different symbols are used for tankers, bulk carriers, cargo ships, container ships and all other ships. The mean RMS values of δ' for tankers and bulk carriers are given in Table 12. In calculating these mean values, results were not segregated by C_B since all ships of a given type should have C_B's greater than or less than 0.70. Sufficient data do not exist for calculation of meaningful statistics for ship types other than tankers and bulk carriers.

Figure 24 indicates that the probabilities of an overshoot angle lying more than one standard deviation from the mean values are:

Block Coefficient	Probability of Value Greater Than	Probability of Value Less Than
C_B	$\delta_m' + \sigma_\delta$	$\delta_m' - \sigma_\delta$
<0.7	0.12	0.15
>0.70	0.12	0.18

The probability that overshoot angle will be within one standard deviation, σ_δ, of the mean value, δ_m, is thus approximately 70 percent in both cases.

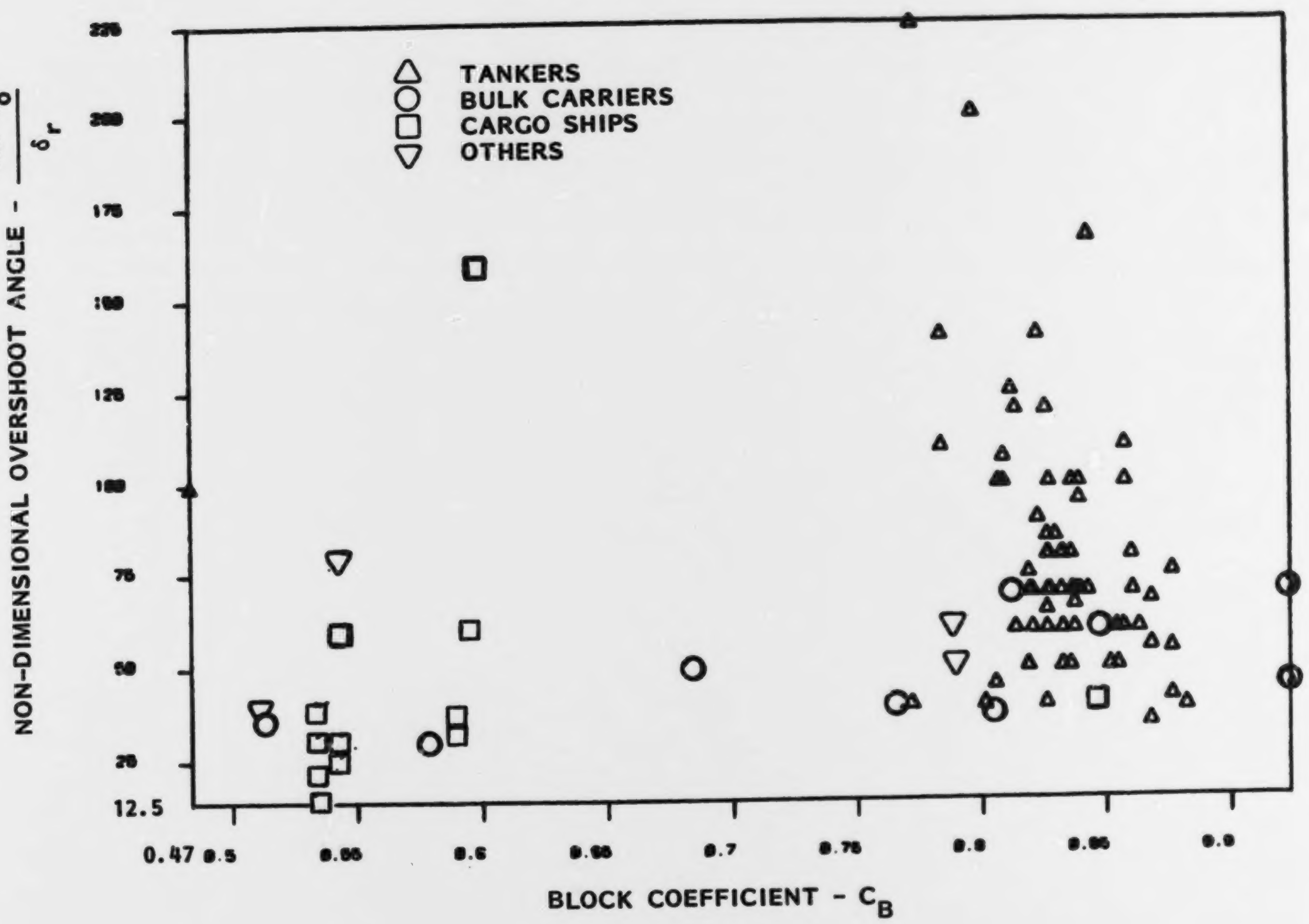

FIGURE 23 - NON-DIMENSIONAL OVERSHOOT ANGLES FOR VARIOUS SHIP TYPES

TABLE 12

Summary of Statistics of Overshoot
Angles from Zig-Zag Maneuvers

Ship Type	Mean Curve - δ_m'	Standard Deviation - σ_δ
All	$0.567 + 0.222\ C_B{}^{*}$	0.35
Tankers	$1.86 - 1.26\ C_B$	0.37
Bulk Carriers	$-0.03 + 0.68\ C_B$	0.11
Cargo Ships	$-0.73 + 2.08\ C_B{}^{**}$	0.09
Other Ships	$-1.28 + 3.13\ C_B{}^{**}$	0.12

*C_B is block coefficient

**These results are not based on sufficient data to be considered meaningful.

This result is useful in formulating levels of performance. Figure 24 indicates that there is, as would be expected, a much larger range of values for overshoot angles greater than the mean value than for those angles less than the mean value.

The use of two sets of measures, with discontinuties at an arbitrary block coefficient of 0.70 (or 0.75) is, from a practical standpoint, undesirable, and might encourage "rule-beating" designs in which a small increase in block coefficient was used to achieve a significant reduction in required controllability (increase in allowable overshoot angle). It was therefore decided to replace the two sets of value of δ_m' and σ_δ' by the following relationships:

$$\delta_m' = 106.28\ C_B - 14.53$$

$$\sigma_\delta' = 33.76$$

These relationships give the same values of δ_m' and σ_δ' as the two sets of values for block coefficients of 0.60 and 0.825, and, are plotted in Figure 25.

Available results provide little basis, other than a purely statistical one, for selecting levels of performance and ratings for overshoot angle. The following ratings have been selected:

Rating	Upper Level	Lower Level	% of Data
Superior	$\delta_m' - \sigma_m$	-	8
Above Average	$\delta_m' - 0.5\ \sigma_m$	$\delta_m' - \sigma_m$	27
Average	$\delta_m' + 0.5\ \sigma_m$	$\delta_m' - 0.5\ \sigma_m$	40
Below Average	$\delta_m' + 1.25\ \sigma_m$	$\delta_m' + 0.5\ \sigma_m$	15
Marginal		$\delta_m' + 1.25\ \sigma_m$	10

The results presented in Section 3.4 indicate that the French LNG ship, which is known to have poor handling performance, has a "marginal" rating. The original 80,000 DWT tanker of the CAORF studies has an "above average" rating

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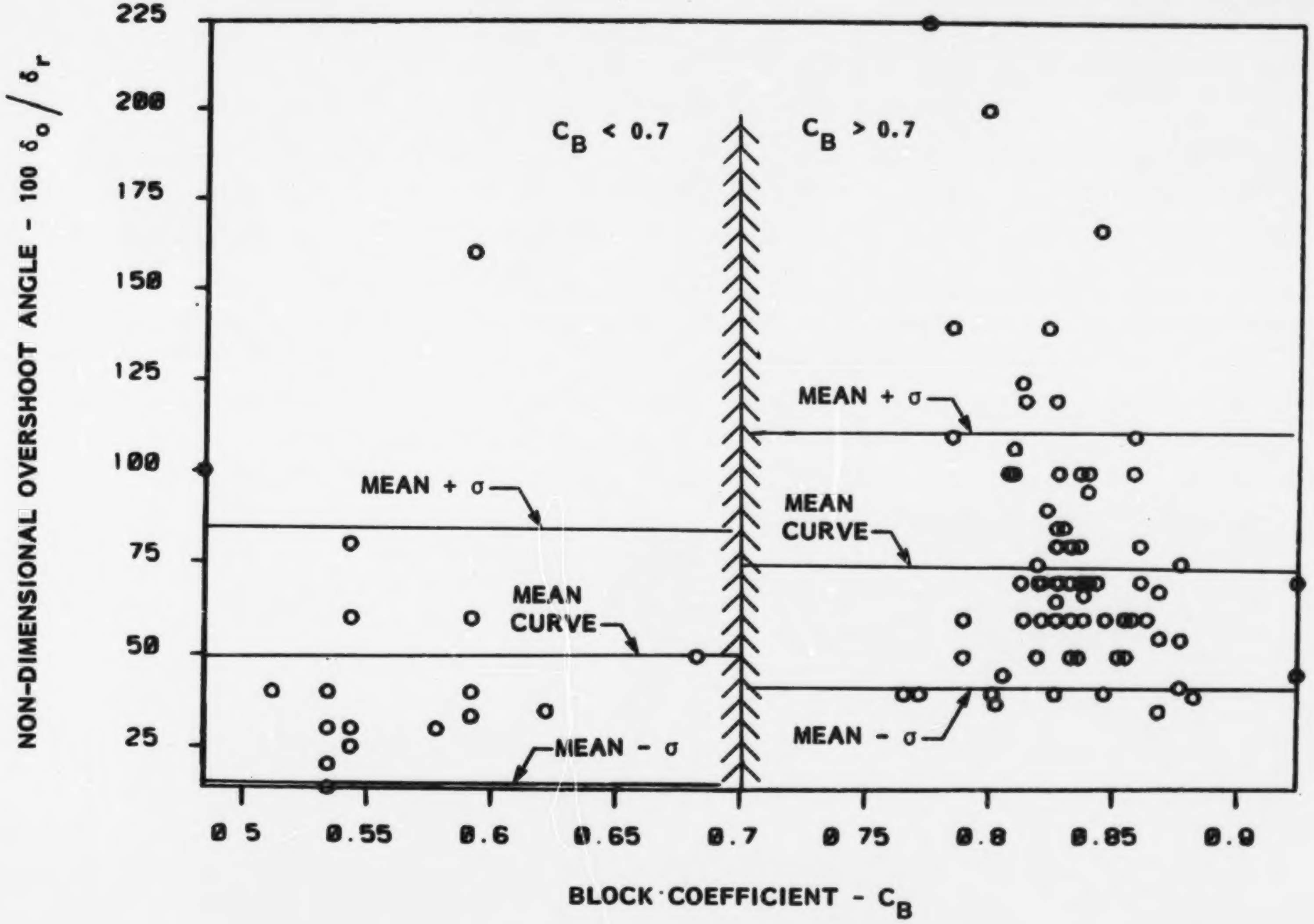

FIGURE 24- ZIG-ZAG OVERSHOOT ANGLE DATA AND ANALYSIS FOR ALL SHIPS

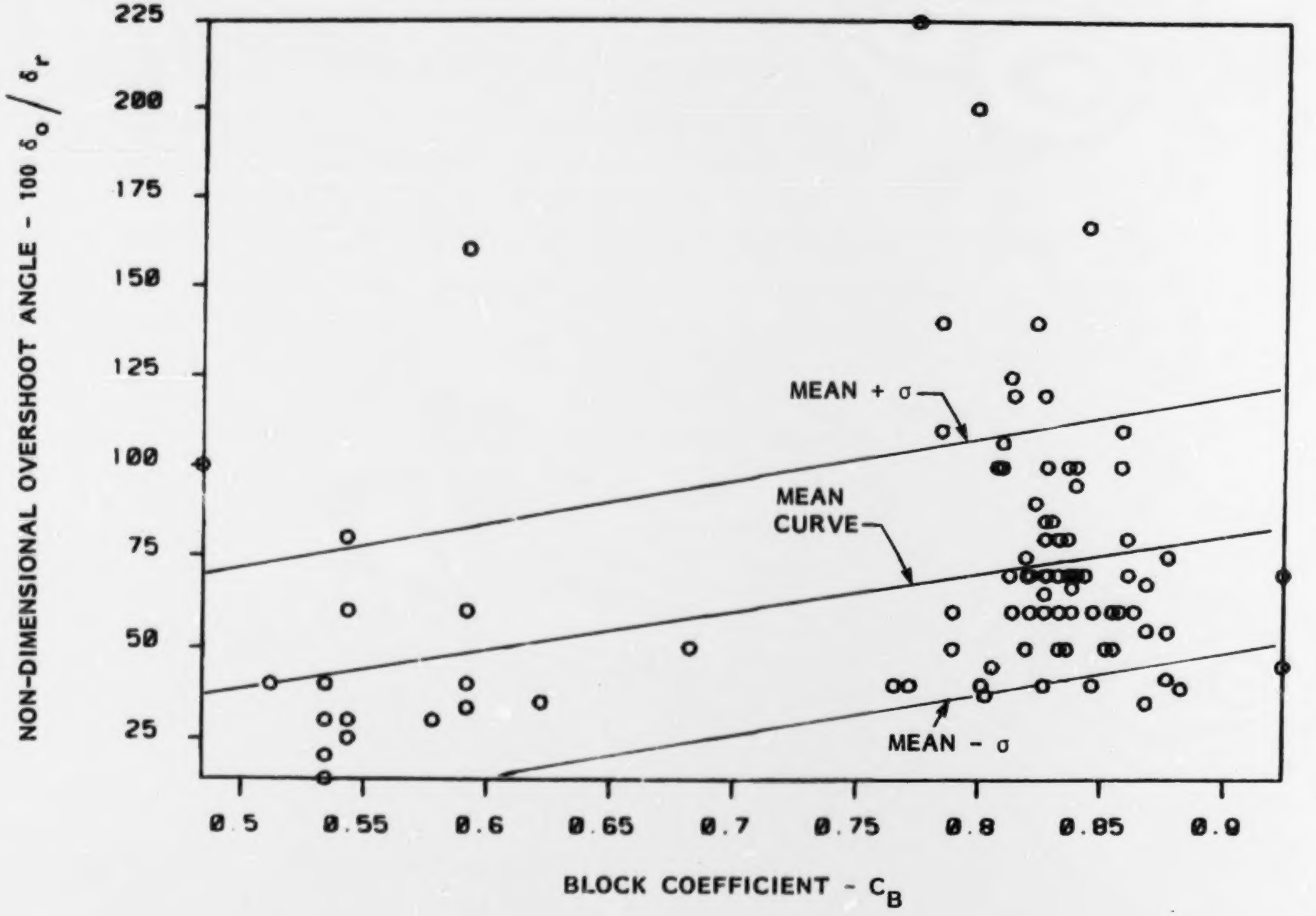

FIGURE 25 - STATISTICAL ANALYSIS OF ALL ZIG-ZAG OVERSHOOT ANGLE DATA

while the degraded ship has an "average" rating, a reflection of the reduced rudder area and controllability.

There is considerable evidence that non-dimensional parameters K' and T', which are often called the Nomoto-Norbin parameters, can provide a good indication of ship controllability. It was felt that these parameters, which are described in detail in Appendix G, could be used to characterize zig-zag performance and ship maneuvering performance. Figures 7 and 26 present a very large body of existing data in this format and clearly indicate that these parameters, when used together, do provide a useful means for characterizing results of zig-zag maneuvers. Both figures indicate that the results for ships in the data base where K' and T' were available are in generally good agreement with results form other sources.

Figure 7 shows a better correlation of data than does Figure 26 but the ordinate of Figure 7 is a function of rudder area, A_R, and hence the parameter

$$\frac{A_R \, L}{K' \nabla}$$

is a measure of maneuvering efficienty rather than absolute maneuvering performance. It is therefore decided to use the basic 1/K' - 1/T' relationship as a measure of maneuvering performance.

The mean curve for all K' - T' data has been estimated to be:

$$K_m^* = 0.625 + 0.375\ T^*$$

where

$$K^* = \frac{1}{K'}$$

$$T^* = \frac{1}{T'}$$

and the subscript m denotes the mean value. Because of the large range of values of K' and T' (two orders of magnitude) the standard deviation does not provide a good basis for defining performance ratings. It is proposed that performance ratings be defined as follows:

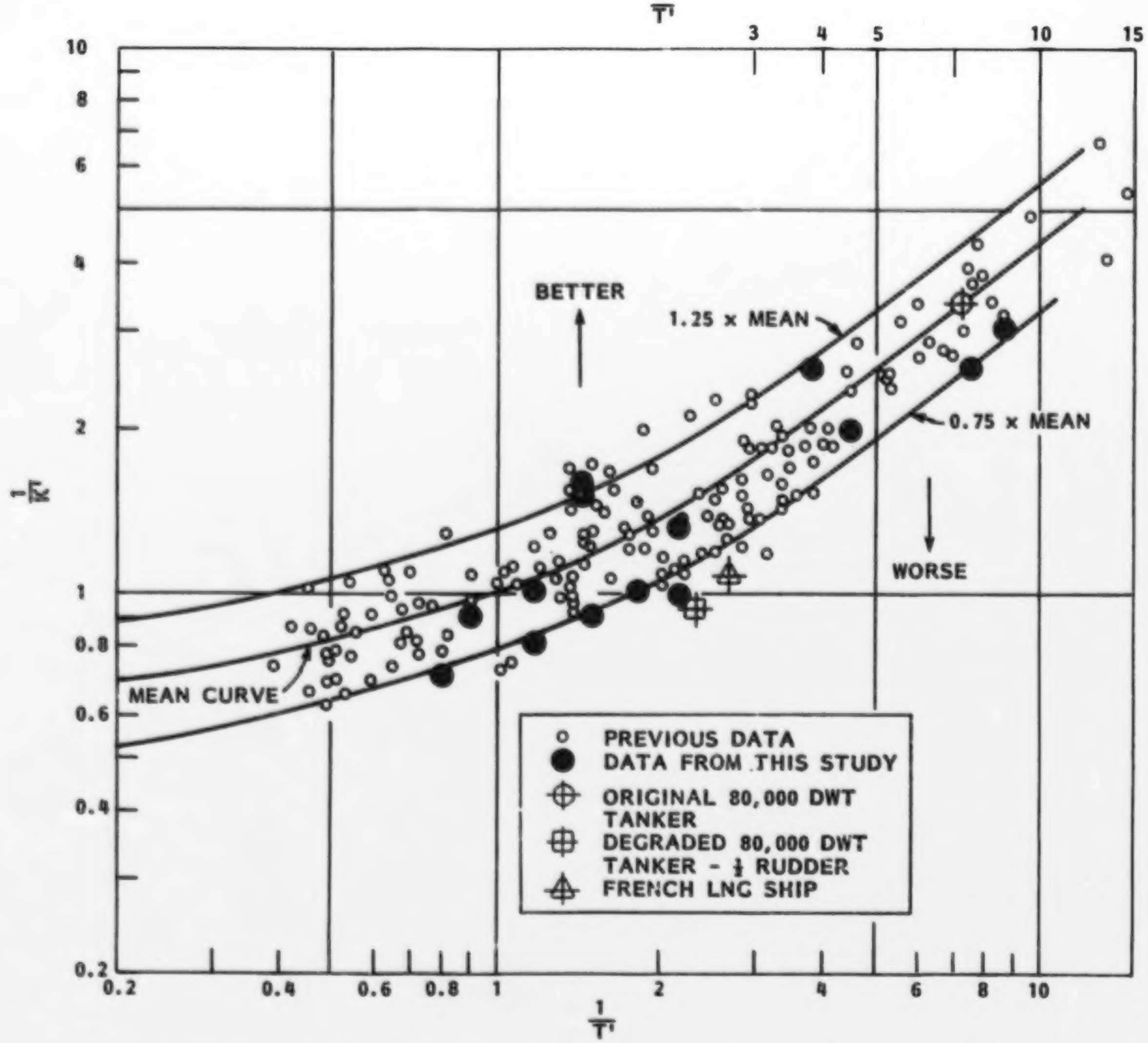

FIGURE 26 - COMPARISON OF VARIOUS DATA FOR ZIG-ZAG PARAMETERS K' AND T'

Rating	Upper Level	Lower Level	% of Data
Superior	-	1.25 K_m^*	6
Above Average	1.25 K_m^*	1.10 K_m^*	18
Average	1.10 K_m^*	0.90 K_m^*	40
Below Average	0.90 K_m^*	0.75 K_m^*	30
Marginal	0.75 K_m^*		6

These ratings are shown on Figure 30. Based on these ratings, the 80,000 DWT tanker and French LNG ship have the following ratings

Original 80,000 DWT tanker - Average
Degraded 80,000 DWT tanker - Marginal
French LNG ship . - Marginal

These ratings seem more consistent with observed or simulated maneuvering ability of these ships than do the ratings based on overshoot angle. This may be an indication that K' and T' provide a better basis for assessing maneuvering performance than does overshoot angle. In view of this fact, and the conclusion that behavior in zig-zags is especially important for assessing maneuvering performance, it is proposed to use both approaches in standards.

3.5.6 Limitation on Use of Trials Data in Establishing Performance Standards - Several factors potentially limit the value of using trials data as a basis for determining performance limits and establishing performance standards. These factors include:

- To date, only a few types of trials maneuvers have been regularly conducted. Economic pressures have tended to minimize trials agendas, as noted earlier, but it should be possible to conduct important additional trials maneuvers at modest cost.
- Trials are generally conducted at a single draft which is often significantly less than the loaded operating draft. Ship behavior at this trials draft can be different than behavior at the normal operating draft, particularly if trials trim is significantly different than operating trim. The trials of the ESSO OSAKA, Crane (1980) provide a useful illustration of the variation of performance with trial draft.

- o Trials do not provide any means for assessing the effect of environment (wind, waves and current) on maneuvering and controllability.
- o Trials are generally conducted in deep water and thus do not provide any means for assessing maneuvering performance in shallow water. The ESSO OSAKA trials, Crane (1979), are an exception.

Dispite these limitiations, trials data must at present be used as the primary basis for defining maneuvering performance levels and standards. Sections 3.4 and 3.5 describe other means used, in conjunction with trials data, to define such standards.

It has been previously noted that the maneuvering performance standards described in this report are intended for use only in deep water. It is not currently possible to define such standards for maneuvering in shallow water or water of restricted channel width, although such conditions frequently exist in important maneuvering situations such as docking, transit of harbor entrances, etc. At present it must be assumed that ships having a given level of performance in deep water will probably have a comparable level of performance in shallow water or restricted channels.

It has been assumed that trials for most or all ships of a given type (tanker, container ship, etc.) are conducted at some representative draft and trim condition and that levels of maneuvering performance at this trials draft/trim condition will be comparable to levels of performance at the normal operating draft/trim condition. This assumption needs verification.

3.6 Assessment of Environmental Effects

Environment (wind, waves and current) can have an important influence on ship maneuvering performance (see, for example, Barr, et al., (1980) and on CRG casualties (Section 3.3 of this report)). Trials data do not provide a basis for assessing the influence of wind, waves and current on maneuvering performance since care is taken in trials to minimize environmental effects.

In the open ocean, wind and waves will generally have a much greater influence than current. In restricted waters, such as harbors and rivers, current can have an effect equal to or greater than wind; waves are generally not an important factor in such waters. Overall, it appears that wind probably has the greatest effect on ship maneuvering and should probably receive primary attention in formulating maneuvering performance standards. Previous studies (see, for example, Martin (1980), Eda, et al., (1979), and Barr, et al., (1980)) have clearly demonstrated the significant effect of wind on ship maneuverability. It was therefore concluded that ship maneuvering performance standards should include some measure of the potential ability of the ship to satisfactorily maneuver in wind.

Computer simulations, using a well validated ship model, provide a means for assessing the effect of wind on maneuvering. It was concluded that results of previous work plus simulation studies for a single tanker in light ballast and full load conditions could be used to provide a measure of wind effect. The 80,000 DWT tanker used in various previous studies, and described by Barr, et al., (1980) was selected. A well validated ship maneuvering model (hydrodynamic/aerodynamic model) exists for this ship. Simulations were carried out for the full load and light ballast conditions. For each of these load conditions, a passage of the ship around the "U"-shaped course shown in Figure 27 was simulated for a range of wind speeds, given in Table 13 to find the wind speed at which the ship became uncontrollable. This course subjects the ship to head, stern and beam winds as well as two moderately tight turns. In all cases the propeller RPM was adjusted for each segment of the course to keep ship speed within ±10 percent of the specified 6.5 knot ship speed.

It was found from the simulation studies that the ship was able to negotiate the course when:

$$\frac{V_{wind}}{V_{ship}} < 8.7 \qquad \text{- light ballast}$$

$$\frac{V_{wind}}{V_{ship}} < 15.6 \qquad \text{- full load.}$$

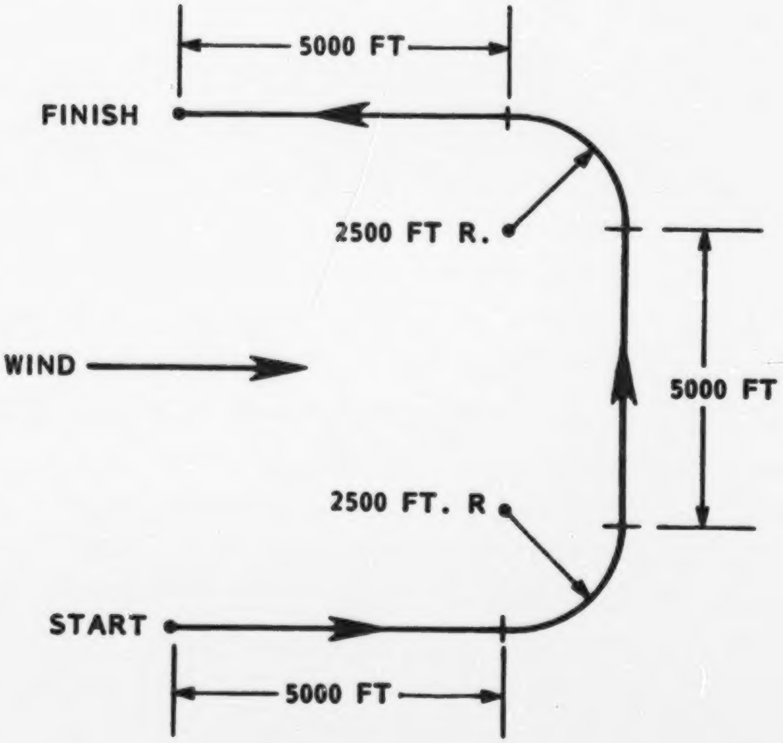
5000 FT
FINISH
2500 FT R.
WIND
5000 FT
2500 FT. R
START
5000 FT

FIGURE 27 - COURSE USED FOR STUDYING EFFECT OF WIND ON SHIP MANEUVERING

TABLE 13

WIND SPEEDS CONSIDERED IN STUDY OF THE EFFECT OF SHIP AERODYNAMICS ON SHIP MANEUVERING

Full Load Condition:

V_{wind} = 12, 21, 27, 34, 40 meters per second

Light Ballast Condition:

V_{wind} = 12, 18, 24, 27, 31 meters per second

(Ship failed to negotiate course at 31 meters per second)

Ship Speed: 3.35 meters per second (6.5 knots) in all cases

For this ship,

$$\left(\frac{A_w}{A_s}\right)_{\text{Full Load}} = 0.572$$

$$\left(\frac{A_w}{A_s}\right)_{\text{Light Ballast}} = 1.683,$$

where A_w and A_s are, respectively, the above-water (windage) profile area and the submerged profile area.

Ship Particulars:	Full Load	Light Ballast
LBP, m	232.6	
B, m	38.1	
T, m	12.2	6.7
A_w, m^2	1622.	2622.

The first result is in agreement with the results of Atkins and Bertsche (1980) which indicate that course deviation for ships in light ballast condition become large for $V_{wind}/V_{ship} > 10$. The results of the simulations further indicate the it is probably feasible to develop an expression which defines the limiting speed ratio and lateral area ratio for which the ship can be controlled in winds. Based on these results, the following expression for an upper limit on allowable operating condition in wind is proposed:

$$\left(\frac{V_{wind}}{V_{ship}}\right)^2 \times \frac{A_w}{A_s} \cong 125$$

where A_s and A_w are the submerged profile and above-water (windage) profile areas, which can be readily calculated from an outboard profile drawing.

For most ships and maneuvering problems, the effect of wind is likely to be crucial only in ballast condition. Notable exceptions would include car carriers and LNG ships. For the 80,000 DWT ship, the full load ship can retain maneuverability with wind speeds up to 80 knots, but with no waves, with a ship speed of five knots. It should be noted that for all but the most restricted water conditions, the influence of waves, which tends to be additive with wind effects, will become large with such large wind velocities.

It is recommended that new ship designs be evaluated on the basis of their ratio of windage profile area to submerged profile area. If this ratio exceeds the critical value from the previous expression, or if

$$\left(\frac{A_w}{A_s}\right)_{\text{light ballast}} > 125 \left(\frac{V_{ship}}{V_{wind}}\right)^2$$

the ship designer or owner should be required to demonstrate, through suitable maneuvering simulations and/or model tests, that the ship can be controlled or maneuvered in the appropriate wind velocity. Appropriate ratios of V_w/V_s, which may reflect local port conditions or ship types, can be specified by the Coast Guard.

In order to provide an interim basis for evaluating potential aerodynamic effects, a representative ratio of wind speed to ship speed has been assumed. The maximum wind speeds expected during ship maneuvering will occur during severe line squalls; in such squalls maximum wind speeds of 55 to 60 knots and sustained wind speeds of up to 40 to 45 knots can occur. Assuming that the maximum wind speed which can be sustained for a long enough period to significantly affect ship behavior is 45 knots and that the ship speed is seven knots, the condition for requiring demonstration of ship handling in wind is

$$\left(\frac{A_w}{A_s}\right)_{\text{light ballast}} > 3.0$$

This value is considered realistic when compared with existing ship design values. Table 13 gives typical area ratios for the 80,000 ton tanker.

3.7 Summary of Findings

It was felt, at the beginning of this study, that the measures of maneuvering performance which would be most important in developing standards were:

- Head reach in crash stop
- Overshoot angle in normal zig-zag
- Overshoot angle in coasting zig-zag
- Tactical diameter or head reach in accelerating turn from zero speed

Collection and review of available maneuvering data confirmed the initial conclusion that data adequate for developing standards existed only for crash stops and normal (constant RPM) zig-zag maneuvers. It was therefore not possible to make the latter two measures part of any proposed standards.

During the course of the study it was concluded that, in addition to head reach in crash stops and overshoot angles in normal zig-zags, the following measures of maneuvering performance should be incorporated into the proposed standards:

- Tactical diameter in normal turn
- Relative values of zig-zag parameters K' and T' (see Appendix G)

For the reasons noted earlier in this section, the particular non-dimensional forms of these measures incorporated in the performance standards are:

- Tactical diameter/ship length ratio from normal turn
- Head reach/ship length times Froude number ratio from crash stop
- Overshoot angle/rudder angle ratio from normal zig-zag
- K' and T' values from normal zig-zag

For each of these measures, levels of performance have been defined based on available data. The corresponding levels of performance for these four measures can be readily determined for a new ship from trials or can be determined during the ship design by suitable model tests and/or simulations.

A ship can have, in theory, a different performance rating (superior, average, etc.) for each of the four measures selected. Safe ship operation requires adequate performance in all aspects of maneuvering and hence each of these measures is important. The use of an overall ship rating, based on an average of the four individual ratings, is thus not considered desirable. With an average rating, marginal performance in one aspect (say, stopping) will not be apparent if other measures (turning and overshoot angle) are average or above average. It is therefore proposed that the overall rating be the same as the lowest or worst individual rating. With this approach, ship performance should always be as good as or better than the performance indicated by the overall rating.

For a given ship, ratings will be determined from results of three basic or standard maneuvers. The conduct of these maneuvers to insure validity of the results is discussed in the next section.

3.8 Trials Maneuvers

In developing a maneuvering trials agenda to be used for establishing vessel performance ratings, it is necessary to select both the types of maneuvers to be conducted and the specific operating conditions associated with each maneuver. The three basic maneuvers required are discussed in the previous section (3.7). The relevent operating conditions include initial ship speed, rudder angle and trials draft or displacement.

Tankers are usually ballasted to design or near design draft for trials, and maneuvering trials for tankers should be conducted at design, full load draft whenever possible. Trials of other ship types are generally conducted at full or partial ballast and fuel conditions, no cargo and thus at a smaller draft and displacement than full load values. Such trials are frequently conducted with significant trim by the stern to insure complete propeller submergence. In order to make trial results most representative of average ship operating conditions, it is proposed that trials for non-tankers be conducted at draft (displacement) and trim as close as possible to the full load values.

Ship maneuvering performance, and head reach and overshoot angle in particular, are dependent on ship speed. In the past, maneuvering trials were usually conducted at or near ship design speed. With some recent, high power ships, such as LNG ships, it has been necessary to conduct turns and zig-zags at significantly lower speeds to avoid severe vibration and machinery damage. Ship maneuvering performance is most important in restricted water conditions where operating speeds are, typically, significantly less than design speed. It is therefore proposed that maneuvering trials used to determine performance rating be conducted as a representation "maneuvering" speed. If desired, supplementary trials at design speed can also be conducted.

No single "maneuvering" speed exists, although 4 to 10 knots appears to be representative of operating speeds for normal maneuvering. For many ships, and particularly for steam turbine powered ships, operators and/or designers establish a maximum "maneuvering" speed. It is proposed that the trials be conducted at various speeds depending on the specific trial. The use of an eight knot maneuvering speed is particularly important for stopping performance, due to the large influence of machinery on performance.

The proposed standards reflect ship operating speed only in the case of stopping performance. Many of the trials data on which the standards are based were obtained at or near ship design speed, rather than at a representative "maneuvering" speed. The selected performance levels may therefore be somewhat biased by speed effects, and it may be necessary to adjust the proposed levels when a significant body of data at "maneuvering" speed are available. It is not anticipated that large adjustments will be required.

Typically, turning maneuvers are conducted with full port and starboard rudder (usually 35 degrees) angles, although with some high speed or high powered ships it has been necessary to use smaller rudder angles, even at reduced trials speeds. The maximum possible rudder angle should be used in turning maneuvers which are used to define maneuvering performance.

The 20^{0}-20^{0} zig-zag maneuvers is by far the most widely used, and it is proposed that this zig-zag maneuver be used in defining performance level. The proposed standards are based on equal rudder and heading angles and trials must be zig-zag maneuvers of this type (20^{0}-20^{0}, 10^{0}-10^{0}, etc.)

Various crash stopping maneuvers, some using the rudder, are conducted. The proposed standards are based on data for crash stops without use of rudder and it is proposed that all crash stopping maneuvers be conducted with zero rudder angle. Supplemental crash stops with rudder may be useful for defining ship capability, but results should not be used to determine performance rating.

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4.0 PROPOSED MANEUVERING STANDARDS AND ALTERNATIVES

A set of proposed standards and a proposed ship trials agenda have been developed. These standards and the trials agenda are based on the factors discussed in Sections 2 and 3 of this report and on an analysis of available ship trials data and maneuvering performance studies, as described in Section 3.

4.1 Proposed Maneuvering Performance Standards

Maneuvering performance standards are intended to provide guidance to ship designers, owners and operators with respect to the maneuvering capabilities of a vessel under normal conditions. These standards should therefore reflect the performance of a vessel relative to other vessels of similar size and type as well as consideration of performance characteristics a vessel should have for safe operations in restricted waters.

Maneuvering performance ratings for a given ship will be assigned on the basis of measured performance in selected trial maneuvers supplemented by special investigations for vessels which fail to meet certain criteria. The standards will be expressed in terms of a relative performance ranking i.e., superior, above average, average, below average and marginal. The performance standards will be applied to a vessel's turning, course changing and course keeping ability, a vessel's stopping ability and a vessel's ability to operate at a moderate speed suitable to a restricted water situation. The maneuvering trials agenda proposed for use in determining performance ranking of a vessel must include as a minimum:

- o Turning maneuver from full maneuvering speed with maximum rudder angle.
- o 20-20 zig-zag maneuver from full maneuvering speed.
- o Stopping maneuver from reduced maneuvering speed.
- o Demonstrated ability to operate at a continuous speed between four and six knots.

Rankings or rating of turning, course changing and course keeping ability have been assigned on the basis of performance in the turning and zig-zag maneuvers. The lowest of the resulting ratings will be the rating applied to the vessel in the turning/course keeping area. The numerical measures used to establish the ratings are:

1. The tactical diameter/length ratio from a full rudder angle turn at full maneuver speed. (eight to 10 knots.)
2. The overshoot angle from a 20-20 zig-zag maneuver performed at full maneuvering speed.
3. The K'-T' relationship from a 20-20 zig-zag maneuver performed at full maneuvering speed.

The relationships between the numerical measures and ratings for each of the maneuvers are defined in Figures 28 through 32 as a function of ship displacement and, for tactical diameter, ship type.

Rankings or Rating of stopping ability will be made on the basis of performance in a crash stopping maneuver carried out from a sustained speed of eight knots. The relationship between the numerical measure and the performance ranking is defined in Figures 33 and 34 for tankers and all other ship types.

The ability of a vessel to maintain a course at a speed suitable to a restricted water situation will be demonstrated on trial by operators at a continuous speed between four and six knots for a period of one-half hour. In addition, for vessels meeting one of the following criteria, acceptable maneuvering performance shall be demonstrated to United States Coast Guard satisfaction during the "design phase" by means of special investigations. These criteria include:

- The ratio of above water profile area to below water profile area exceeds three in the minimum operating draft condition.*
- No rudders are located in the ship stream of a propeller.
- Propeller direction of rotation (or direction of propeller thrust) cannot be changed four times in one minute (interim values).

---

* The ratio three is based on a wind speed of 45 knots, which is a value that can be expected to exist for a significant period of time during a sudden squall, and a typical ship speed of seven knots. Other limiting ratios of above water to below water profile area will be defined for other assumed values of ship and wind speed.

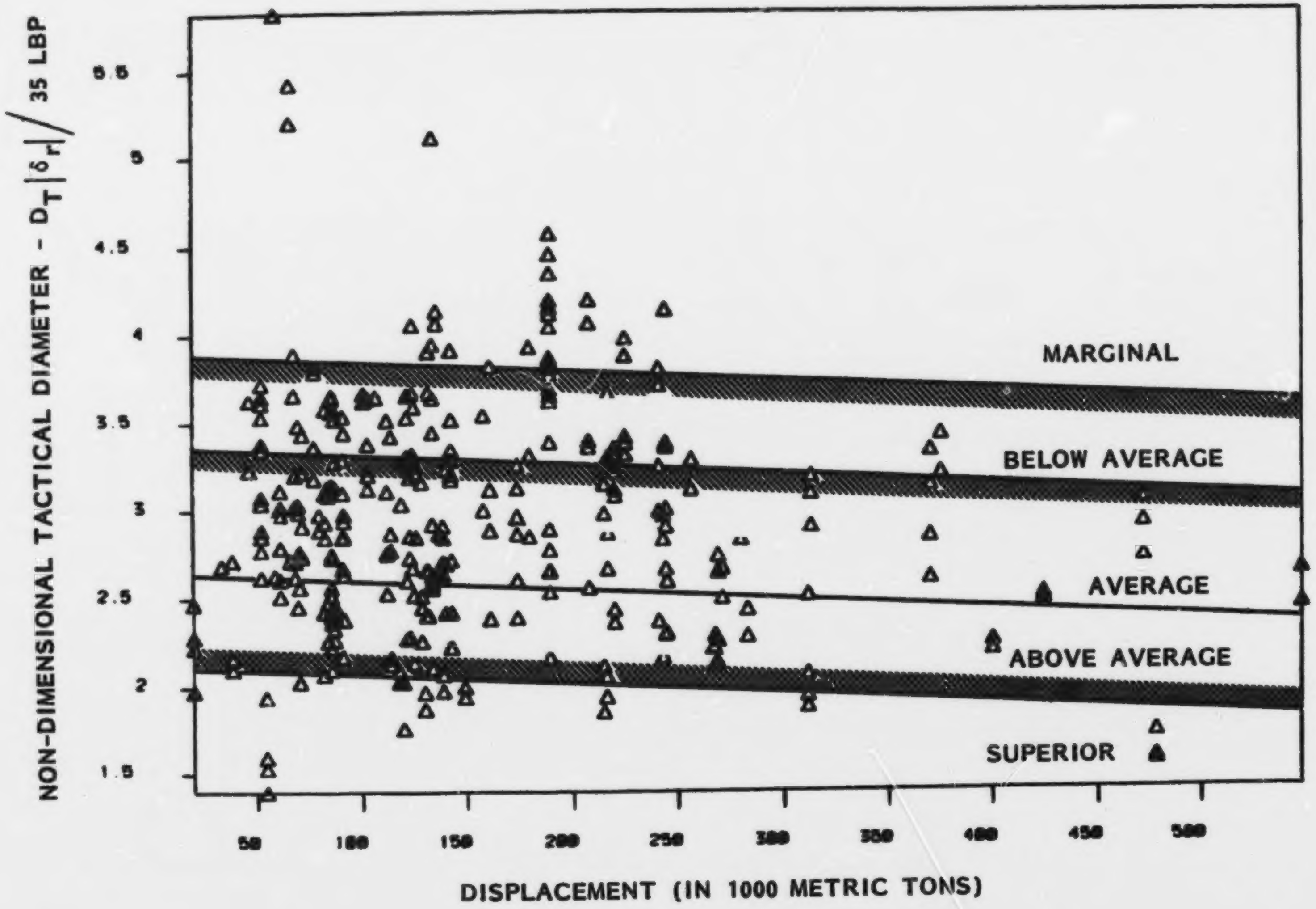

FIGURE 28 - PERFORMANCE RATINGS BASED ON TANKER TACTICAL DIAMETER

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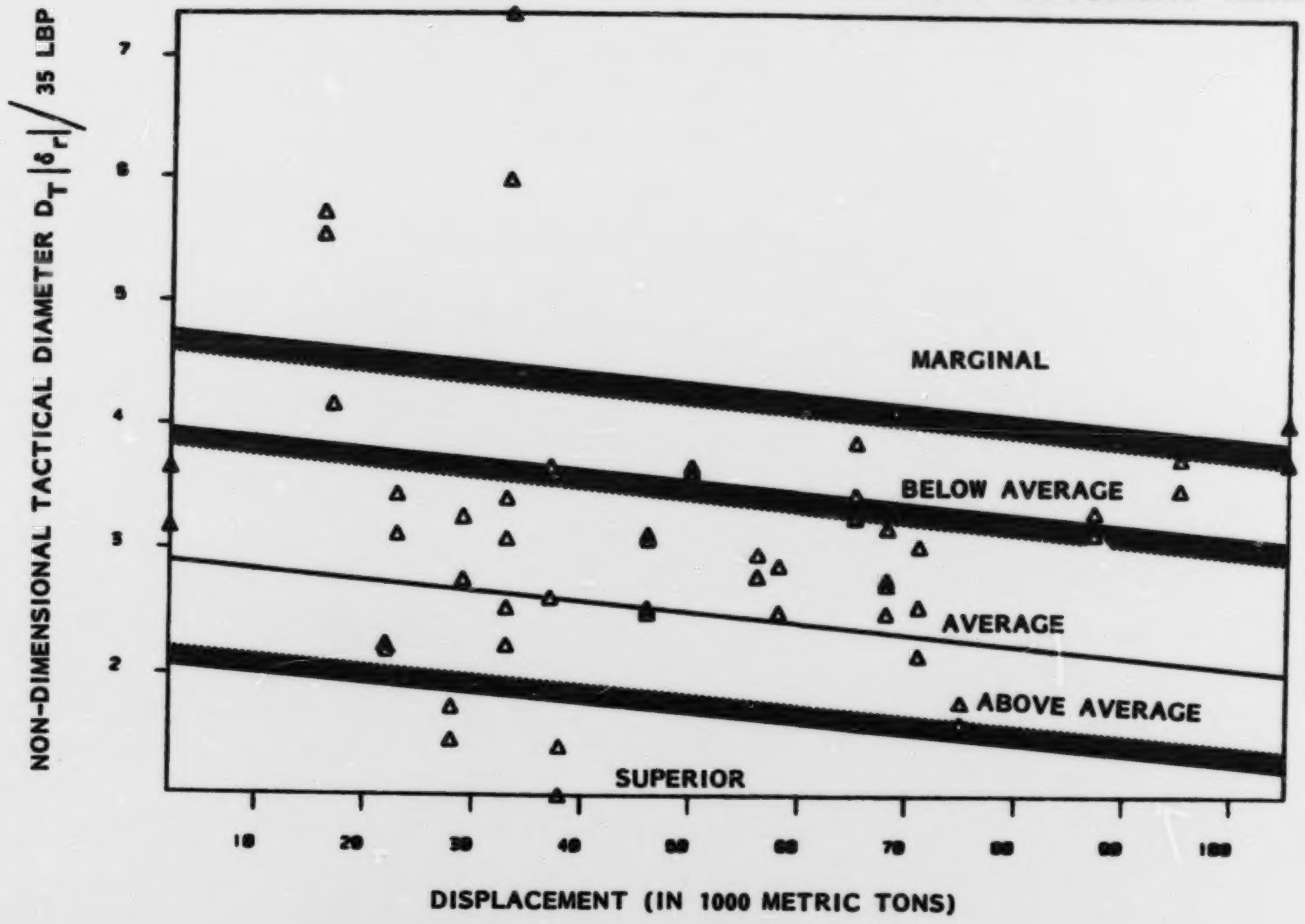

FIGURE 29 - PERFORMANCE RATINGS BASED ON BULK CARRIER TACTICAL DIAMETER

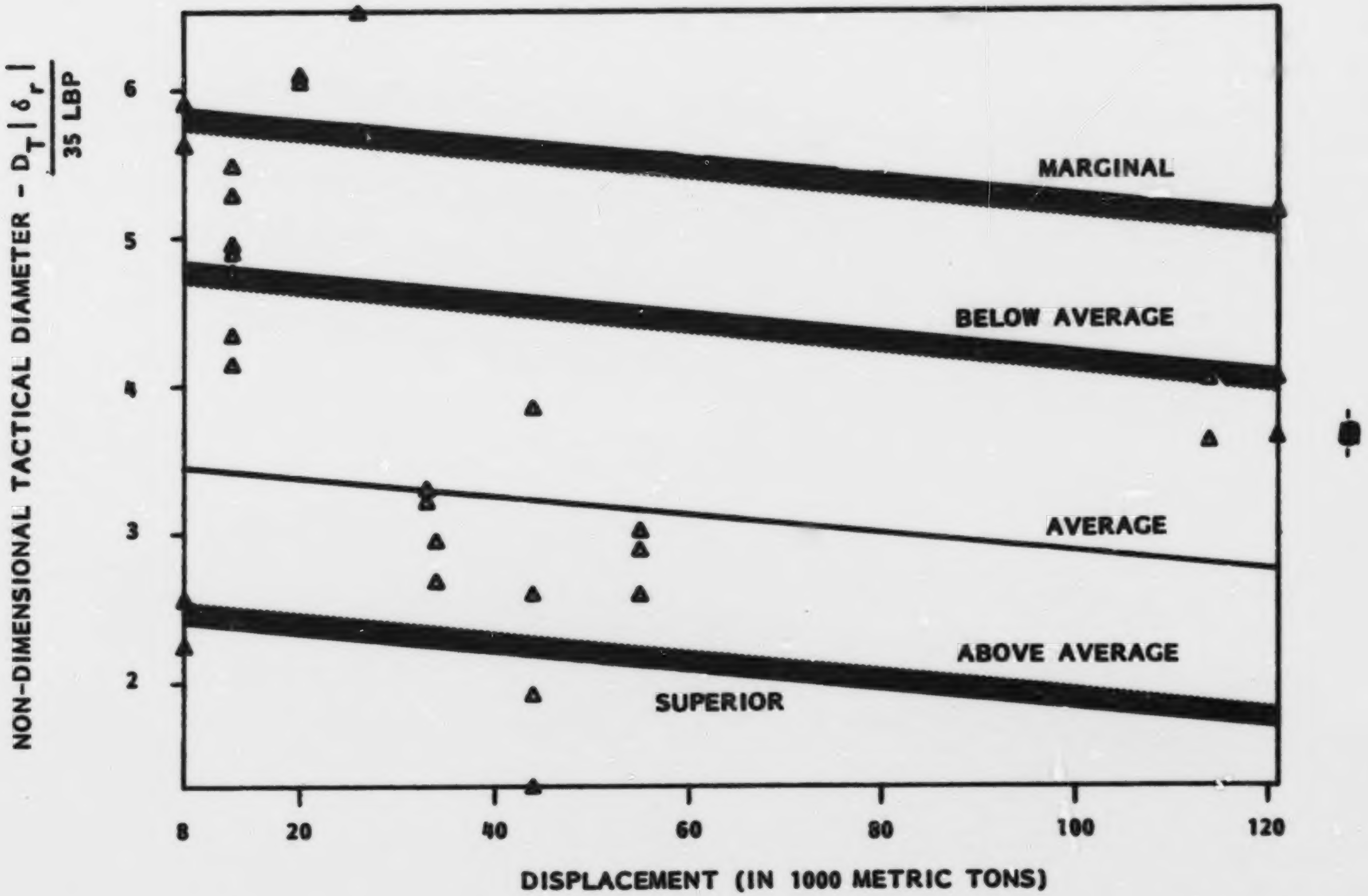

FIGURE 30 - PERFORMANCE RATINGS BASED ON CARGO AND CONTAINER SHIP TACTICAL DIAMETER

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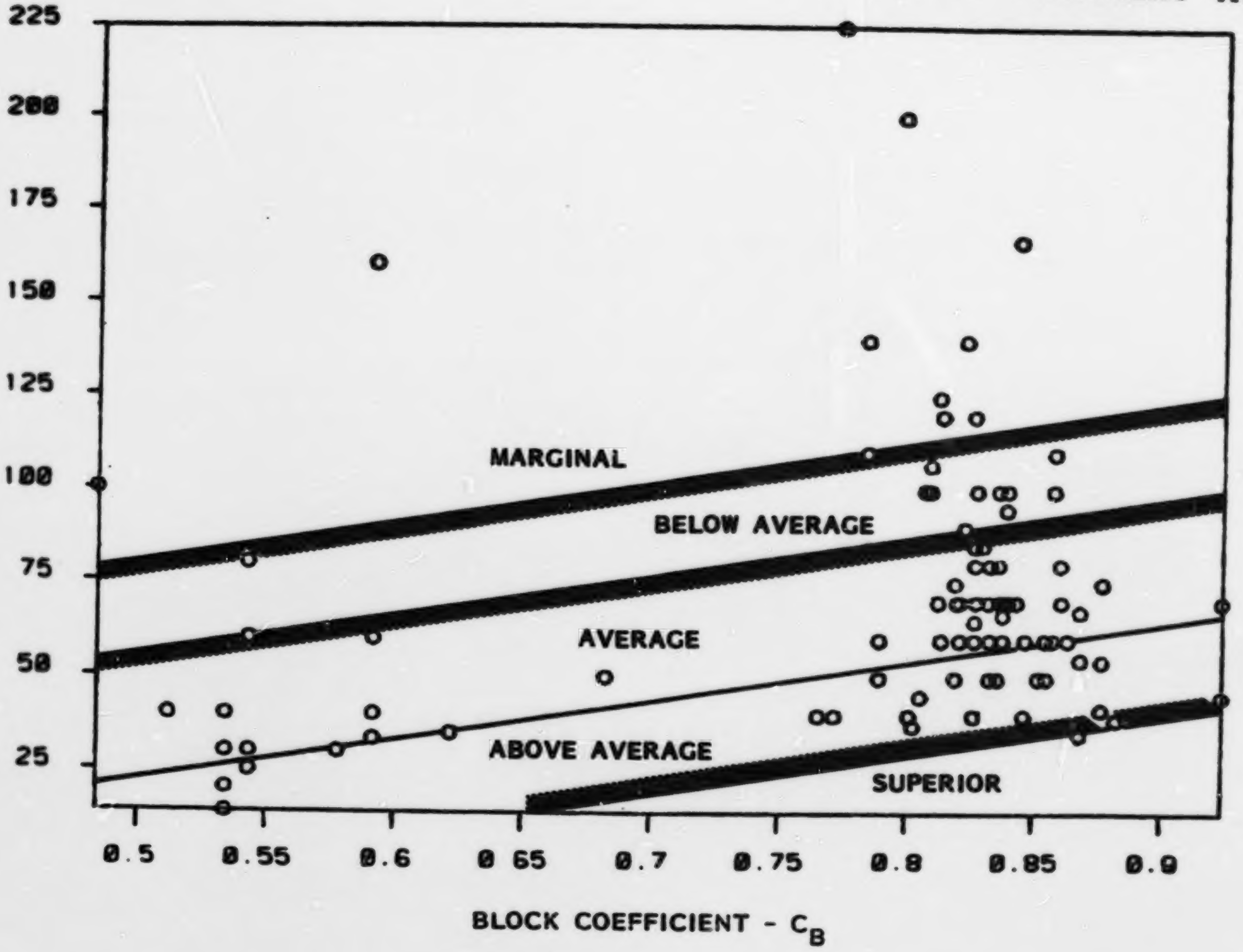

FIGURE 31 - PERFORMANCE RATINGS BASED ON OVERSHOOT ANGLE

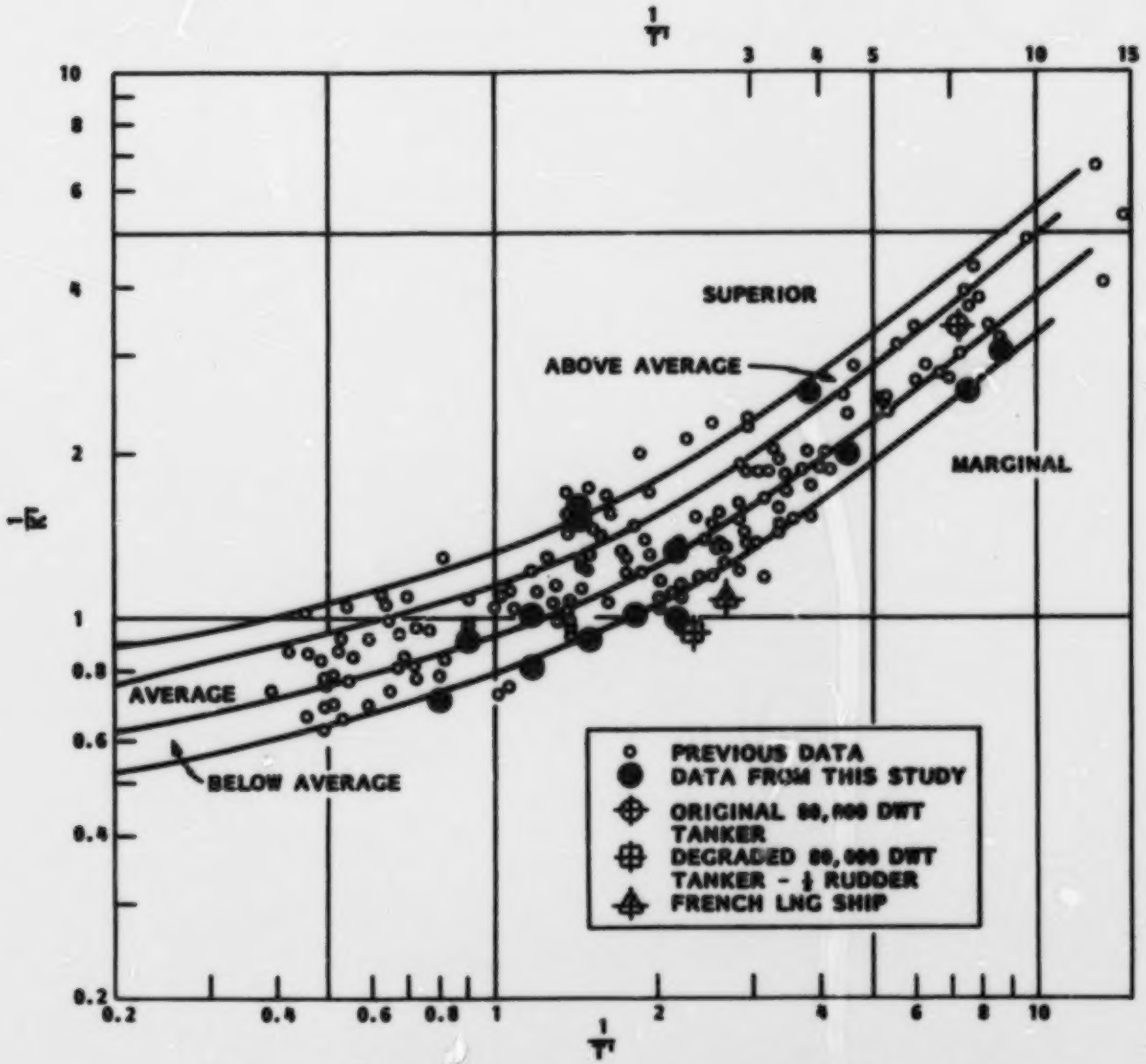

FIGURE 32 - PERFORMANCE RATINGS BASED ON ZIG-ZAG PARAMETERS K' AND T' APPLICABLE TO ALL SHIP TYPES

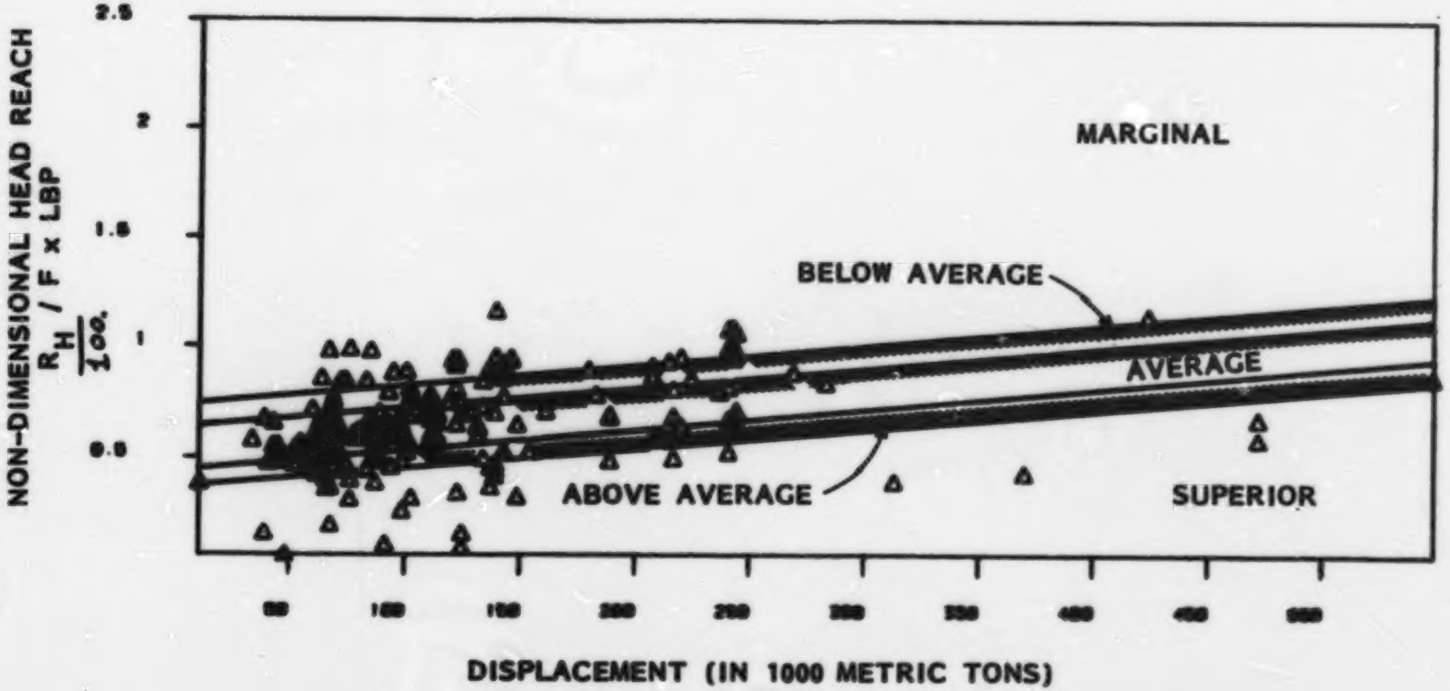

FIGURE 33 - PERFORMANCE RATINGS FOR TANKERS ONLY BASED ON STOPPING HEAD REACH

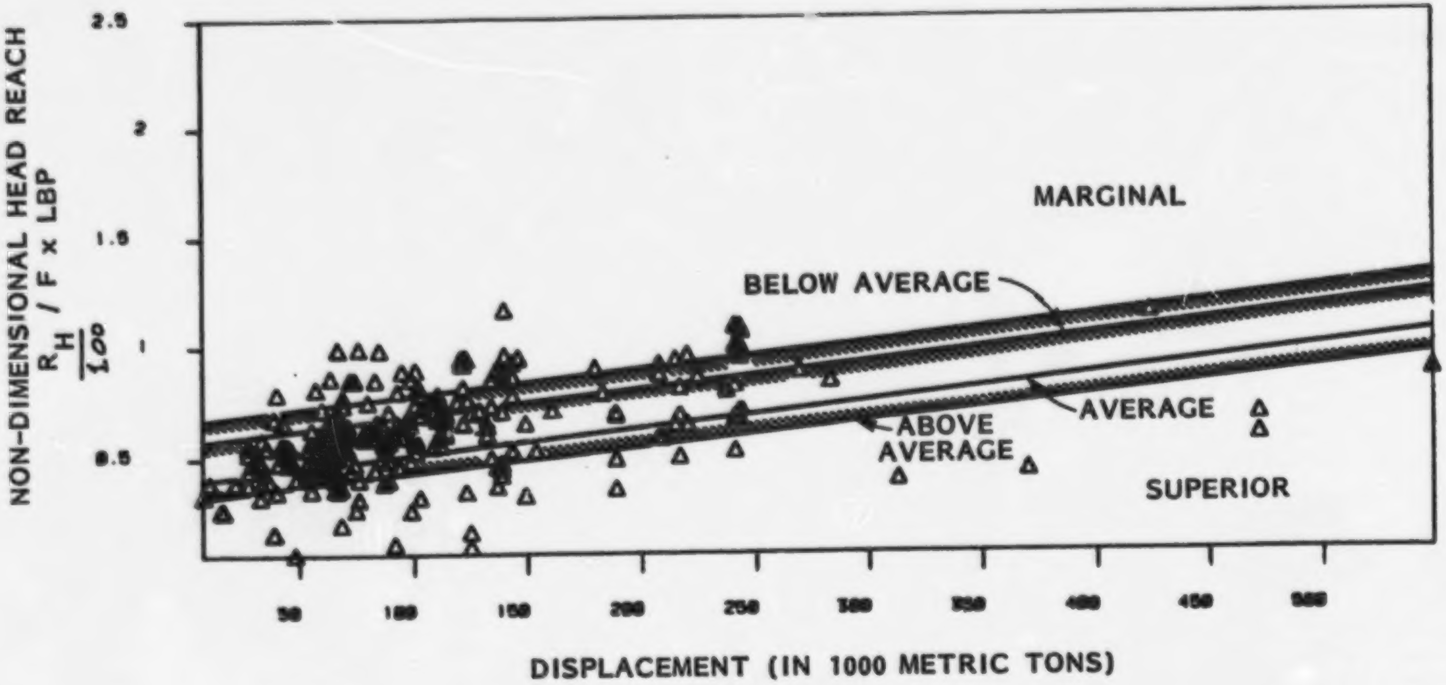

FIGURE 34 - PERFORMANCE RATINGS BASED ON STOPPING DATA FOR ALL SHIPS - APPLICABLE TO ALL SHIP TYPES BUT TANKERS

4.2 Proposed Trial Agenda

Maneuvering performance standard of a vessel will be assigned on the basis of numerical measures from trial maneuvers. The trial maneuvers to be carried out, as discussed in Section 3.8, include:

- Turning maneuver from full maneuvering speed with maximum rudder angle.
- 20-20 zig-zag maneuvers from full maneuvering speed.
- Crash stopping maneuvers from reduced maneuvering speed.
- Demonstration of ability to operate at a continuous speed between four and six knots.

With the exception of the maneuver which demonstrates the ability to operate continuously at low speed, these maneuvers are similar to those usually carried out during a complete new ship trial. The trial procedures to be used for the turn, 20-20 zig-zag maneuvers and crash stop maneuver are defined in the SNAME Research Bulletin (1975). As a test of the ships machinery, it is likely that a crash stopping maneuver will be carried out from design speed. For the purpose of the maneuvering performance ranking, an additional stopping maneuver carried out with the vessel operating at a continuous speed of about eight knots ahead is required. It is suggested that this stopping maneuver be carried out at the conclusion of the one-half hour continuous low speed run.

For ships which have diesel powerplants, and may not be able to operate continuously at low power levels, and for which trials are conducted at or near full load condition, as is typical for bulk carriers, the designer or builder must demonstrate to the Coast Guard, using approved computational procedures, that the ship can maintain steady-state operation at a speed between four and six knots for the minimum operating load condition.

4.3 Additional Trials Agenda

The proposed standards and trials agenda of Sections 4.1 and 4.2 reflect the limits of available trials data. It was not possible to indicate other potentially important maneuvers and performance measures due to the lack of performance data for such maneuvers.

Based on our understanding of ship maneuvering and controllability, two additional maneuvers are considered highly desirable and should be strongly recommended, but not required. These are:

- Coasting zig-zag in which the propeller is stopped at the initiation of the maneuver.
- Standing turn in which the propeller is started and the rudder is put over simultaneously, with the ship at zero speed.

The performance measures for these maneuvers are the same as those for the standard zig-zag and turn. It would be highly desirable to include performance measures from one or both of these measures in future standards, if some representative body of trials data could be obtained. It might be feasible to supplement limited trials data with model test and/or simulation results.

It is proposed to conduct all trials maneuvers at various "maneuvering" speeds rather than ship design speed. It is considered useful, but not essential, to conduct supplement trials for some or all maneuvers at or near design speed, when feasible. If such trials are conducted, the same measures of performance should be determined and compared with "maneuvering" speed values to determine speed sensitivity but should not be used to determine ship performance rating.

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5.0 CONCLUSIONS AND RECOMMENDATIONS

The important conclusions of this study of maneuvering performance under non-emergency conditions are perhaps best reflected by the proposed performance standards and trials agenda. The most important of the conclusions include:

1. It is currently not feasible or desirable to establish absolute (go/no go) performance standards in which some ships are rated unacceptable. A relative rating system of the type recommended in this study provides the best means for assessing expected ship maneuvering ability both during ship design and following trials. This approach is considered the feasible one.

2. It was possible to rely heavily on a straightforward statistical analysis of trials data in formulating the proposed standards.

3. Ship performance in normal turns, crash stops and zig-zag maneuvers are all important for rating performance. Relative importances cannot be assigned to these maneuvers, although the proposed standards do give somewhat greater weight to the zig-zag.

4. Large differences in maneuvering performance between different ship and machinery types exist, particularly variations of turning with ship type. Where required and feasible different ratings have been provided for different ship types.

5. If an overall ship performance rating is needed, this rating should be based on the lowest of the individual ratings rather than an average rating.

6. Trials used to determine maneuvering performance ratings should be conducted at a typical maneuvering speed rather than ship design speed.

7. The proposed rating system is considered a significant first step and the proposed standards are considered suitable for immediate use in rating ship maneuvering performance. However, additional work and refinements, as described below are needed to develop an improved rating system.

The most important recommendations for additional work arising from this study include:

1. Determine, through interviews of pilots, masters and Coast Guard port office personnel, ships which have particularly good or bad maneuvering performance and, if these ships are not in the data base, attempt to obtain trials data for these ships. Use these results to refine the proposed standards.
2. Continue and complete current efforts to interview pilots and masters to determine what standard maneuvers would best characterize ship maneuverability in restricted waters and what special ship characteristics, such as diesel restarts, are particularly important.
3. Conduct additional simulation studies, such as the CAORF restricted waterways studies, to better establish relationships between ship controllability and ship performance in standard or trials maneuvers. These results can then be used to refine the proposed ratings.
4. Attempt to validate the proposed standards by conducting a more detailed study of the relationship between ship CRG casualties and ship maneuvering performance, as determined from the data base.
5. Consider the impact on standards, perhaps through simulation studies, of ship trials that are conducted at draft and trim much different than those which occur under normal operation and determine if different trials procedures are required.
6. If possible collect additional data, particularly for cargo and container ships so that individual ratings by ship type can be determined for performance measures other than tactical diameter.

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APPENDIX A

Fourteenth ITTC Discussion of Recommendations for an ITTC 1975 Maneuvering Trial Code

From Volume 2 of Proceedings of the
Fourteenth International Towing Tank Conference

14TH INTERNATIONAL TOWING TANK CONFERENCE 1975
REPORT OF MANOEUVRABILITY COMMITTEE
APPENDIX I

DISCUSSION AND RECOMMENDATIONS FOR AN ITTC 1975 MANOEUVRING TRIAL CODE

by Bernard Nizery

1. INTRODUCTION

In 1963, the 10th ITTC had proposed standard manoeuvres for sea trials, namely :

- Turning circles over a range of ship speeds on approach and rudder angles, the minimum requirements for rudder angle being 15 degrees and the maximum angle.

- Zigzag manoeuvres executed at different approach speeds. Manoeuvres could include various rudder angles and changes of heading, the standard one being with a rudder angle of 20 degrees and a change of heading of 20 degrees too.

- Spiral manoeuvres over a range of rudder angle from 25 degrees on one side to 25 degrees on the other one, and back again.

- Change of headings test to establish the time for 5 degrees change of heading using 5 degrees of rudder angle, for a range of approach speeds.

From this time, ship's sizes have increased in a large way, new ship types appeared, the use of special manoeuvring devices happened more often; in the theoretical way, computation methods using more and more elaborated mathematical models have been brought out so that ship manoeuvring features can be computed.

So, it was obviously necessary to review the ITTC recommendations, and, in 1972, the 13th ITTC recommended to the manoeuvrability committee to formulate a new manoeuvring trial code as a guide line for trial trip and research programs.

2. EXISTING CODES AND RECOMMENDATIONS

In fact, since 1963, besides recommendations given by the 10th ITTC or the manoeuvring trial code previously published by the Society of Naval Architects and Marine Engineers (SNAME), other new codes or recommendations have been issued by different societies. The different existing trial codes that the manoeuvrability committeo had in hand were studied and analysed, viz :

- SNAME : Society of Naval Architects and Marine Engineers - Code on Manoeuvring and Special Trials and Test, published in July 1950 and Code for Sea Trials 1973, published in January 1974.

- BSRA : British Ship Research Association - Code of Procedure for Steering and Manœuvring Trials - Report n° 353 published in 1972.

- DnV : Det Norske Veritas - Navigational Aids and Bridge System - Section 8.D. -'Testing on Board-Manoeuvrability, published in January 1974.

So, new tests have been introduced or proposed; main of them are coasting stop test, stopping test by use of rudder, turning test with propulsion stopped, turning test from zero speed, pull-out manoeuvre, reverse spiral, and different tests for ships fitted with lateral thruster. For complete information on procedures of these trials, original codes have to be consulted.

Lately new manoeuvring tests have been proposed by K. Nomoto and H. Fujii; two of them are intended to study the handling characteristics of a ship in the vicinity of a straight course when small helm is applied : the zigzag manoeuvre test for small rudder angle, and the modified zigzag manoeuvre test; the first one is similar to the standard zigzag test but is carried out for the rudder angle of ± 5° only; in the second one the heading angle for the switching of the rudder is made as small as 1°, the rudder angle being ± 5° or ± 10°.

The "new course test" has been proposed too by K. Nomoto and H. Fujii; when running at normal speed execute of the rudder to 15° starboard is made; when the heading deviates 10° from the initial heading course, the rudder is executed to 15° part;turning motion gradually subsides until it arrives at complete rest; in this instant the rudder is brought back to amidships. Similar process is repeated for another test beginning with 15° part helm. It is recommended to make test also for 20° and 30° heading other than for 10° heading.

Also a test for rudder effectiveness at low speed is proposed by K. Nomoto and H. Fujii; the purpose of the test is to obtain the lower limit of the ship's inertia-speed below which the effectiveness of the rudder fades away. When the ship is running at prescribed speed, order is given to stop engine; the rudder is executed to 35° starboard and when the response heading reached 1° starboard the rudder is turned to 35° port.

The Committee also investigated the recommendations of the Inter-Governmental Maritime Consultative Organization (IMCO) formulated in a resolution adopted on 12th October 1971, concerning information to be included in the manoeuvring booklet available on boards, particularly in large ships and ships carrying dangerous chemical in bulk. In a safety purpose, the following information are required : the lowest constant engine revolutions per minute at which the ship case safely steer under normal ballast condition and normal loaded condition; change of heading diagrams and turning circles to port and starboard giving advance and transfer time and distance, using maximum rudder angle from an initial full speed and slow speed with constant engine control setting; turning circle information from initial full speed with maximum rudder angle and engines stopped; approximate time and distance a vessel will travel with a minimum application of rudder if it retains approximately its initial heading in both loaded and ballast conditions from initial full speed after stopping engines, and initial full speed by the application of astern power at various levels (should the ship turn, the track reach until the ship is almost still in water -one knot- should be given). It is pointed out by IMCO that all data provided should be for calm weather, no current and deep water conditions with clean hull and these facts should be clearly noted on the data displayed with warning that the vessel's response may significantly change under different conditions, including shallow water.

3. RECOMMENDATIONS FOR AN ITTC 1975 MANOEUVRING TRIAL CODE

To make out new draft recommendations for the 14th ITTC the following topics have been considered :

- Tests have to provide owners and builders with information on ship handling characteristics for operation purpose; for this reason, beyond tests at maximum speed, tests at medium and low speed, used in the channels and the harbours vicinity, have been recommended too.

- For operation purpose tests must concern coursekeeping qualities, course changing qualities and qualities for emergency manoeuvres.

For course-keeping qualities the suitable tests methods proposed are the spiral test, the reverse spiral test and the zigzag manoeuvre test with small rudder angle.

For course changing qualities, the zigzag manoeuvre test and the 15 degrees helm turning test and change of heading test have been considered.

For emergency manoeuvres qualities the suitable tests methods proposed are the maximum helm turning test and the crash-stop astern test.

- Tests have to supply with ship handling data on the field of ship design and scientific purpose.

- Only tests regarded as reliable after a long enough experience have been considered; for that reason some new tests have not been included in the recommendations, in spite of their possible interest.

- The total duration of manoeuvring tests should be acceptable for owners and builders during sea-trials.

Detailed information about tests procedures, trials conditions and recording requirements are given hereafter.

The annexed table compares the list of manoeuvring tests recommended or proposed by the codes of BSRA, SNAME, DnV, 10th ITTC and by the present proposal to ITTC 1975.

Furthermore, it should be noted that complete information for investigation and analysis of zigzag tests by an elaborated method are given in a contribution of Nomoto and Kose "Analogue Zigzag Test Analyser" included as an appendix to the Committee Report.

A contribution of Brix "Some Characteristics Ship Steering Values in Dimensionless Form" gives a lot of values to which results of ship manoeuvrability trials can be compared. That paper is included too as an appendix to the Committee Report.

4. TESTS PROCEDURES

1. Turning circles

Performed to both port and starboard at maximum speed with a maximum rudder angle and with a rudder angle of 15 degrees (it is necessary to do a turning circle of 540° at least to determine the main parameters of this trial).

The essential information to be obtained from this manoeuvre consists of tactical diameter, advance, transfer loss of speed on steady turn, and times to change heading 90 degrees and 180 degrees respectively (See fig. 1). The first three of these may be presented in non dimensional form by dividing their values by ship's wetted length. Maximum advance and maximum transfer can be measured too.

When it is possible turning circle at medium speed and low speed should be considered.

2. Pull-out

The pull-out manoeuvre is a simple test to give a quick indication of a ship's course stability. A rudder angle of approximately 20 degrees is applied and the ship allowed to achieve a steady rate of turn; at this point, the rudder is returned to midship. If the ship is stable, the rate of turn will decay to zero for turns to both port and starboard. If the ship is unstable, then the rate of turn will reduce to some residual rate of turn. The pull-out manoeuvres have to be performed to both port and starboard to show a possible asymmetry (See fig. 2). Normally, pull-out manoeuvres are to be associated with the 15 degrees turning trials.

3. Turning trials from zero speed

Performed to both port and starboard from zero speed with maximum rudder angle and engine ½ ahead ordered. The trial is ended when the heading has changed by 180 degrees.

From the turning circle advance (90 degrees change of heading), transfer (90 degrees change of heading), tactical diameter (180 degrees change of heading) and maximum transfer and advance are measured. (For definitions of these quantities refer to fig. 1).

4. Zigzag manoeuvre

The zigzag manoeuvre is obtained by reversing the rudder alternately by δ degrees to either side at a deviation ψ from the initial course. After a steady approach the rudder is put over to right (first execute). When the heading is ψ degrees off the initial course, the rudder is reversed to the same position to left (second execute). After counter rudder has been applied, the ship continues turning in the original direction with decreasing turning speed until the movement decayed. Then, in response to the rudder

...

the ship turns to left. When the heading is ψ degrees off the course left, the rudder is reversed again to right (third execute). This process continues until a total of 5 rudder executes have been completed.

The standard value of change of heading ψ is 10 degrees. A modified test with a change of heading of 20 degrees can be considered too.

The manoeuvres are to be executed at maximum approach speed and if possible at medium speed also.

Judging the steerability as a function of the turning direction, it is to be pointed out that from the nautical point of view, i.e. the interpretation of the international rules of navigation at sea, the turning and the yaw checking ability using starboard rudder angles δ are of special interest, since emergency turns should be carried out to starboard. For this reason, the standard zigzag manoeuvre test starts with starboard rudder angle application.

For a first simple analysis of the results, characteristic steering values defined in fig. 3 can be used; the values are plotted as a function of the rudder angle δ.

Further investigation and analysis of the results can be made by more elaborated methods using mathematical models as described by different authors.

5. Direct and reverse spiral tests

The manoeuvres provide a qualitative measurement of the course stability of the ship (See fig. 4). For ships which show stable characteristics either the Dieudonné direct or Bech reverse spiral methods can be used to obtain response at low rudder angles. For unstable ships, the Bech reverse spiral is recommended within the limits indicated by the results of the pull-out manoeuvres.

5.1 Direct spiral manoeuvre

With the ship on an initial straight course, the rudder is put to about 25 degrees starboard and held until the rate of change of heading is constant. The rudder angle is then decreased by 5 degrees and again held until steady conditions of turning have been obtained. This procedure is repeated until the rudder has covered the range from 25 degrees on one side to 25 degrees on the other side and back again. Over the range of rudder angles of 5 degrees on either side of zero or neutral rudder angle these intervals should be reduced.

The rate of turn is noted for each rudder angle.

This manoeuvre should be carried out in still air and calm water conditions.

5.2 Reverse spiral manoeuvre

In the Bech reverse spiral the ship is steered at a constant rate of turn and the mean rudder angle required to produce this yaw rate is measured.

The necessary equipment is a rate-gyro (alternatively the gyro-compass course ψ may be differentiated to provide $\dot{\psi}$), and an accurate rudder angle indicator. Experience has shown that accuracy can be improved if continuous recording of rate of turn and rudder angle are available for the analysis.

If manual steering is used, the instantaneous rate of turn must be visually displayed for the helmsman, either on a recorder or on a rate of turn indicator.

Using the reverse spiral test, points on the curve rate of turn versus rudder angle may be taken in any order.

Procedure originally proposed by Bech for obtaining a point of the curve can be recommended; it is as follows :

The ship is made to approach the desired rate of turn, ψ_o , by applying a moderate rudder angle. As soon as the desired rate of turn is obtained, the rudder is actuated such as to maintain this rate of turn as precisely as possible. The helmsman should now aim to maintain the desired rate of turn using progressively decreasing rudder motions until steady values of speed and rate of turn have been obtained. Steady rate of turn will usually be obtained very rapidly, since rate-steering is easier to perform than normal compass steering.

However, a slight drift of the apparent mean rudder angle may occur due to change of speed, and in order that the speed may become steady it is necessary to allow some time before the time average values of $\dot{\psi}$ and δ are evaluated.

The rudder fluctuations around the mean value should not exceed ± 4 degrees and in practice it is normally possible to stay within ± 2 degrees.

Somewhat different procedure can be used for the reverse spiral test according to Nomoto, Fujino and others.

When several spiral tests are to be made, an auto-pilot can be used to perform the reverse spiral.

6. Change of heading

Change of heading for a range of approach speeds and rudder angles are useful for navigation purposes. A part of information can be obtained from turning trials and zigzag initial transients.

7. Stopping trials

7.1 Crash-stop

The most common manoeuvre in stopping trials is the crash-stop from the full ahead speed. The ship unfortunately is usually directionally uncontrollable during this manoeuvre and the path of the ship is, to a large extent, determined by the ambient conditions.

7.2 Stopping trial at low speed

The opportunity of stopping trial at low speed is recommended because of the practical interest of this manoeuvre for navigation purpose. The engine is reversed at full astern. The track of the ship can be obtained using a suitable tracking system.

The parameters measured for crash-stop and stopping trial are (See fig. 5) :

- the head reach which is defined as distance travelled in the direction of the ship's initial course;

- the track reach which is the total distance travelled along the ship's path;

- the lateral deviation which is the distance to port or starboard measured normal to the ship's initial course.

For crash-stop and stopping trial at low speed, the rudder is kept amidship.

8. Lateral thruster tests

For a ship fitted with a lateral thruster the following tests are recommended.

8.1 Turning manoeuvre

Turning manoeuvres on port and starboard with full output of the thruster and main rudders amidship, in a range of

[redacted]

speed comprised between zero and 8 knots. The manoeuvre should be continued until 90 degrees change of heading has been completed. Initial condition is the ship bow directly into the wind.

8.2 Zigzag manoeuvre

Zigzag manoeuvre with full output of the thruster and main rudders amidship are recommended with 10 degrees change of heading. Initial condition is ahead speed of 3 - 6 knots with heading directly into the wind.

It is recommended for special types of ships such as ferries to carry out zigzag manoeuvres as above with a speed of approximately 3 knots astern.

5. TESTS CONDITIONS

1. Ship load conditions

Test should be carried out on full load conditions and besides, for tankers and bulcarriers, on ballast conditions.

2. Water depth

Trials have to be performed with a sufficient depth of water in order that the effect of shallow water should be insignificant.

3. Weather conditions

Trials should be made with a wind and a sea as still as possible.

For direct spiral manoeuvre still air and calm water conditions are required.

For reverse spiral test, zigzag test, pull-out test and bow thruster test, it is recommended that wind does not exceed Beaufort 2.

For other trials it is recommended that sea does not exceed 3 and wind Beaufort 4.

6. RECORDING REQUIREMENTS

During the different trials, the following data have to

[redacted]

be recorded :

1. Turning circle, turning circle from zero speed, crash-stop and low speeds stopping

   - Successive positions of the ship
   - Speed of the ship
   - Speed of the propeller (r.p.m.)
   - Heading
   - Rudder angle
   - Torque on rudder main piece (for turning circle only)
   - Possibly torque and thrust on the propeller shaft

2. Pull-out

   - Speed of the ship
   - Speed of the propeller (r.p.m.)
   - Rate of turn and, if not available, heading as function of time
   - Rudder angle

3. Zigzag

   - Successive positions of the ship
   - Speed of the ship
   - Speed of the propeller (r.p.m.)
   - Heading as function of time
   - Rudder angle as function of time
   - Rudder speed

4. Direct and reverse spiral

   - Speed of the ship
   - Heading

   or - Rate of turn

   - Rudder angle

5. Change of heading

   - Speed of the ship
   - Heading
   - Rudder angle

6. Bow thruster tests

   - Speed of the ship

[redacted]

- Speed of the propeller (r.p.m.)
- Heading

For all the tests measurements will be started two or three minutes before the first execute, and in any case the approach should be recorded.

For all the tests, weather conditions, viz. : wind direction and velocity, and sea should be noted. Stream direction and velocity should be noted too.

MANOEUVRING TRIALS CODES

	BSRA	SNAME	DnV	10th ITTC	14th ITTC
Crash-stop (AV) at full speed	x	x	x		x
Stopping trial at low speed					x
Coasting stop test			x		
Crash-stop (AR)		x			
Stopping by use of rudder			x		
Turning test at full speed	x	x	x	x	x
Turning test at medium speed					x
Turning test at slow speed	x		x		x
Turning test with propulsion stopped			x		
Turning test from zero speed	x				x
Pull-out	x				x
Weave manoeuvre	x				
Zigzag	x	x	x	x	x
Direct spiral	x			x	x
Reverse spiral	x		x		x
Statistical method	x				
Change of heading				x	x
Lateral thruster :					
- Turning test			x		x
- Zigzag test, ahead			x		x
- Zigzag test, astern			x		x
- Course-keep test, astern			x		

[redacted]

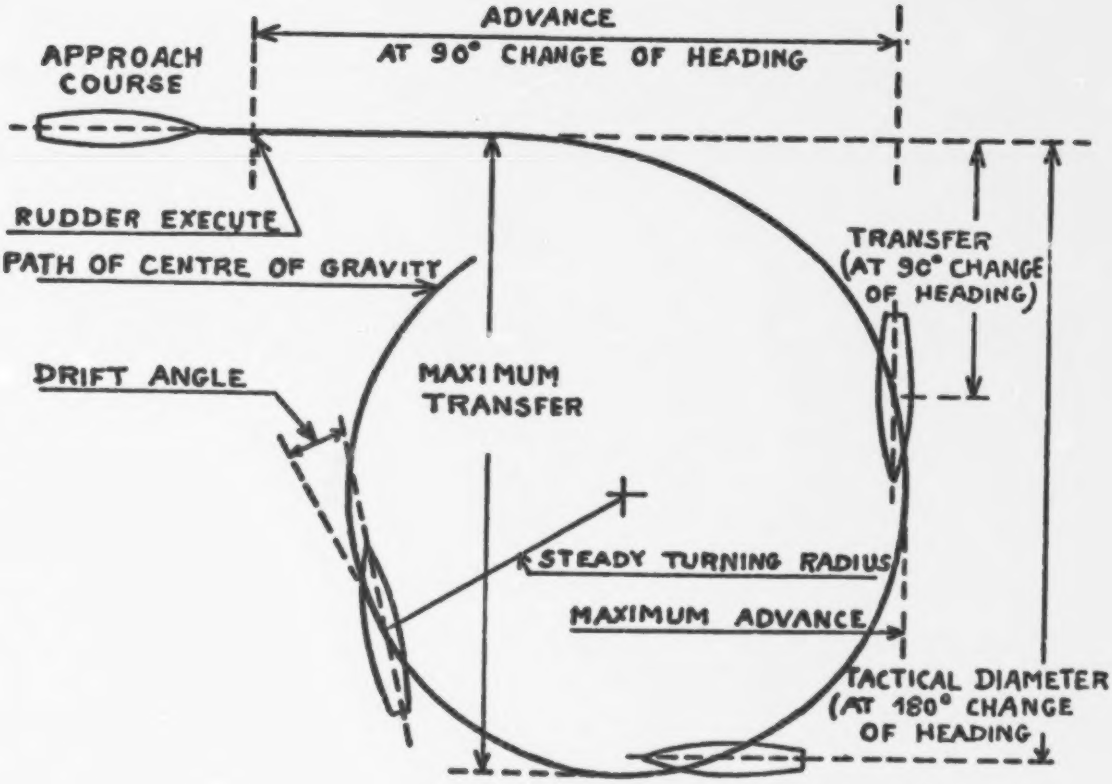
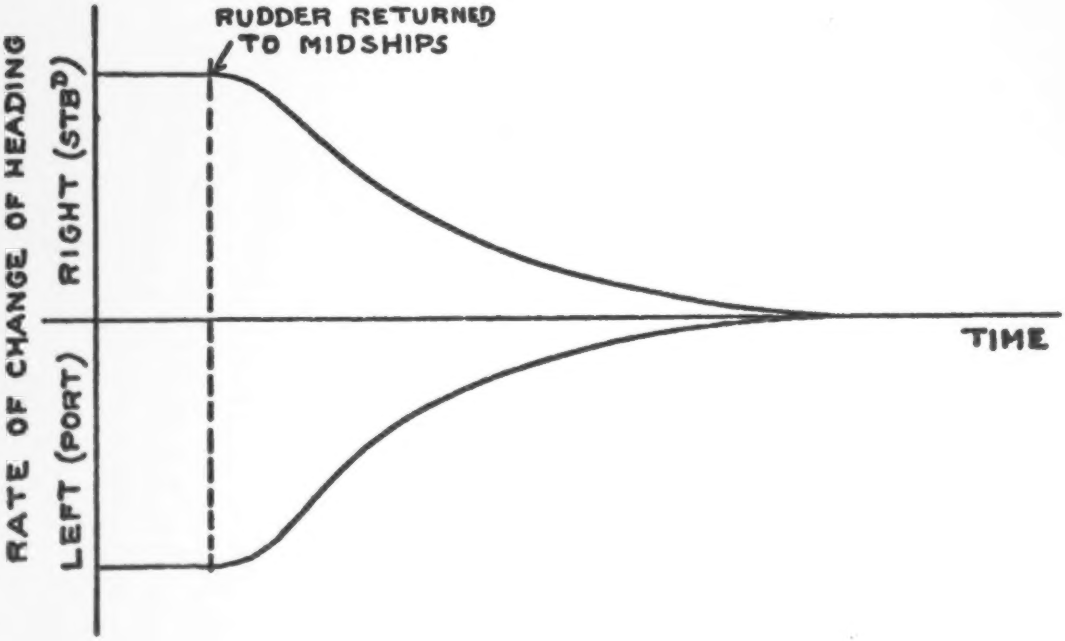

ADVANCE
AT 90° CHANGE OF HEADING
APPROACH COURSE
RUDDER EXECUTE
PATH OF CENTRE OF GRAVITY
TRANSFER (AT 90° CHANGE OF HEADING)
DRIFT ANGLE
MAXIMUM TRANSFER
STEADY TURNING RADIUS
MAXIMUM ADVANCE
TACTICAL DIAMETER (AT 180° CHANGE OF HEADING)

FIG. 1

[redacted]

PRESENTATION OF PULL-OUT MANOEUVRE RESULTS

STABLE SHIP



UNSTABLE SHIP

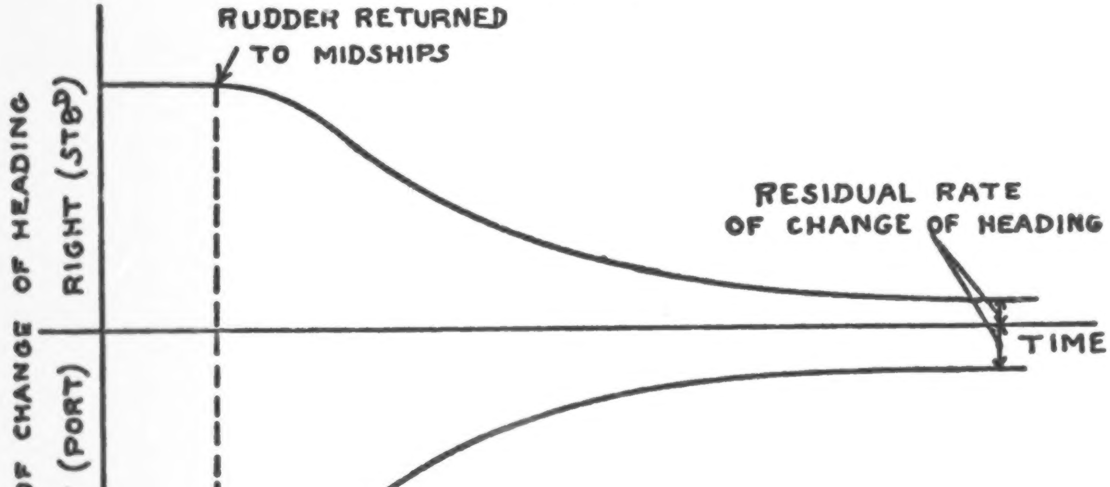


FIG. 2

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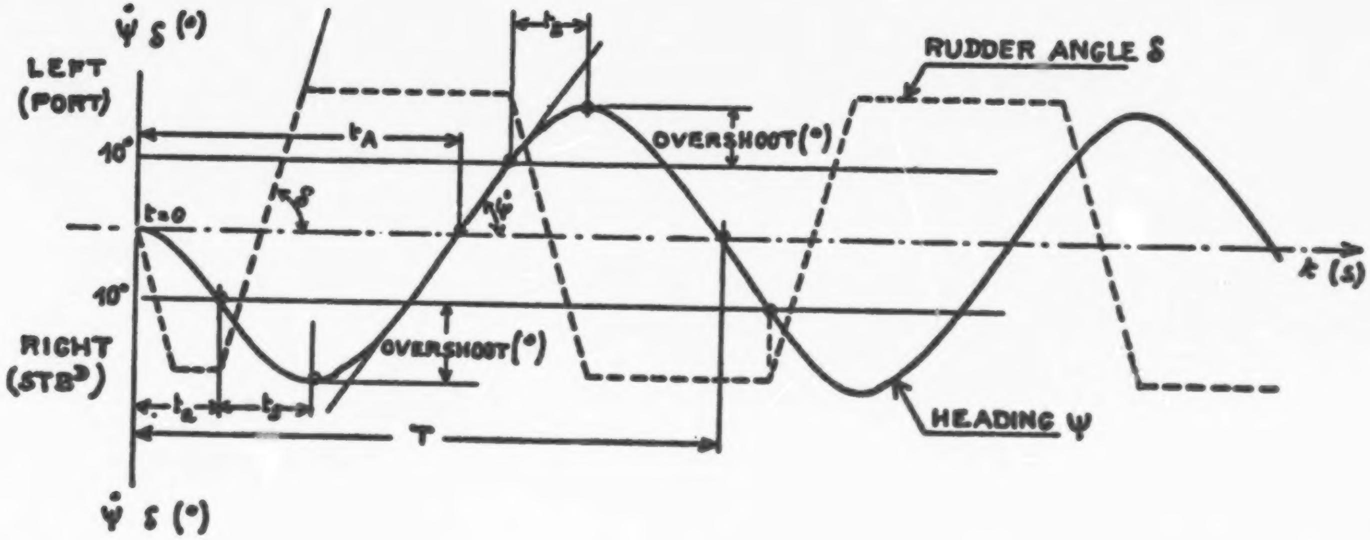
SCHEME OF ZIG ZAG MANOEUVRE TEST



$\dot{\psi}\ \delta$ (°)
LEFT (PORT)
10°
$t=0$
10°
RIGHT (STBD)
$\dot{\psi}\ \delta$ (°)
t_A
$\dot{\delta}$
$\dot{\psi}$
t_s
OVERSHOOT(°)
OVERSHOOT(°)
t_a
t_s
T
RUDDER ANGLE δ
HEADING ψ
t (s)

FIG. 3 (a)

Definitions for zigzag manoeuvre test

1. Initial turning time t_a (sec)

The time from the instant the rudder is put at the outset of the manoeuvre (first execute) until the heading is Ψ deg. off the initial course. At this instant the rudder is reversed to the opposite side (second execute).

2. Execute heading angle

Heading Ψ at which the rudder is reversed, in these tests $\Psi = 10$ deg. (or eventually 20 deg.)

3. Yaw (overshoot) (deg.)

The angle through which the ship continues to turn in the original direction after the application of counter rudder.

4. Time to check yaw t_S , t_B (sec)

The time from the instant counter rudder is applied to the standstill of the turning movement in the original direction.

5. Heading Ψ (deg.)

The deviation in deg. from the straight initial course.

6. Reach t_A (sec)

The time from the outset of the manoeuvre (first execute) until the ship, after having completed the starboard turn, passes the initial course.

7. Time of a complete cycle T (sec)

The time from the outset of the manoeuvre until one total cycle (yaw to starboard and port) has been completed.

8. Angular speed $\dot{\Psi}$ (deg/sec)

The angle through which the vessel turns in one second at constant turning speed to port. In this phase the ship model travels in a semi-turning circle motion.

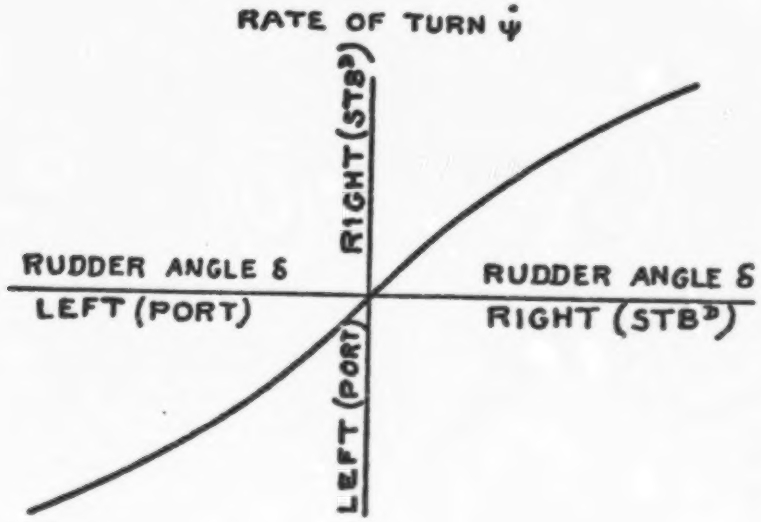
9. Unit time

The time required for the vessel to travel her own length at approach speed. The time for a complete cycle is expressed in unit times.

Fig. 3 (b)

PRESENTATION OF SPIRAL MANOEUVRE RESULTS

STABLE SHIP



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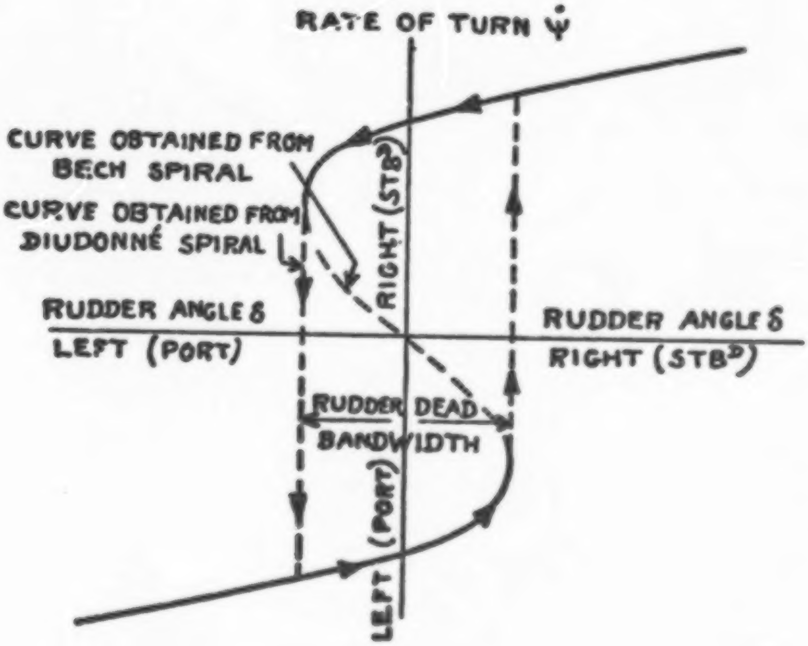

FIG. 4

[redacted]

DEFINITIONS USED IN STOPPING TRIALS

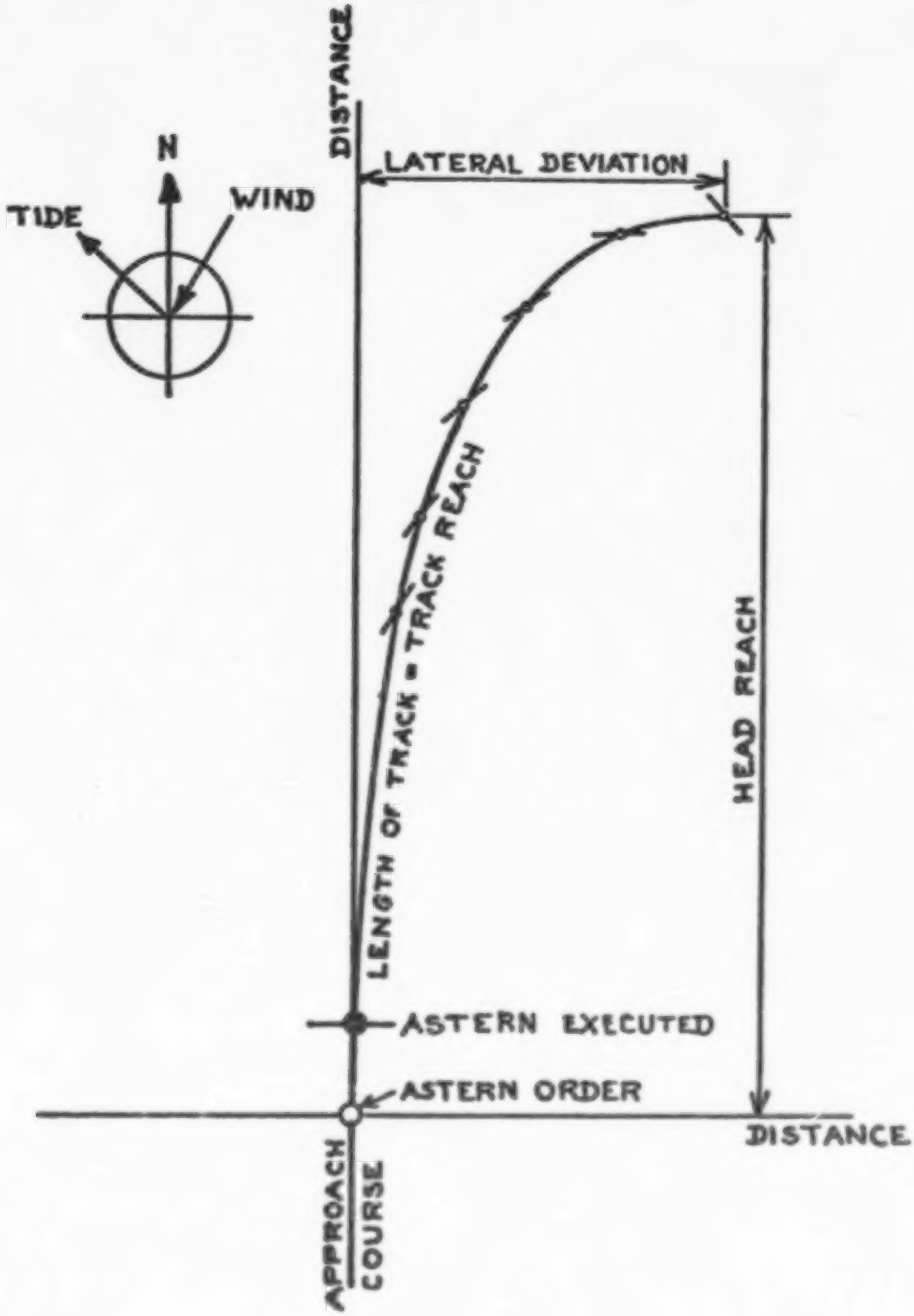
N
TIDE
WIND
DISTANCE
LATERAL DEVIATION
LENGTH OF TRACK = TRACK REACH
HEAD REACH
ASTERN EXECUTED
ASTERN ORDER
DISTANCE
APPROACH COURSE

FIG. 5

APPENDIX B

SNAME Paper by Miller, Ankudinov and Ternes on "Evaluation of Concepts for Improved Controllability of Tank Vessels."

Published in Marine Technology, Volume 18, No. 4, Oct. 1981

Marine Technology, Vol. 18, No. 4, Oct. 1981, pp. 365-381

Evaluation of Concepts for Improved Controllability of Tank Vessels

E. Miller,[1] V. Ankudinov,[1] and T. Ternes[1]

There is interest in the potential for reducing tank vessel collision, ramming and grounding (CRG) casualties by improving the inherent controllability of the vessel. This paper reports on studies conducted for the Maritime Administration in which various concepts for improving the controllability of tank vessels were investigated. A detailed study of U.S. Coast Guard tanker CRG casualty data and reports covering a five-year period was carried out to determine typical casualty situations and to make an initial assessment of the potential effects of improved controllability. From this effort, various measures of controllability were identified. In order to determine the performance of various concepts, studies with a baseline ship of about 84 000 dwt were carried out. The mathematical models used were based on model tests and analysis of information in the literature. The concepts investigated included a conventional single propeller/rudder configuration as a baseline and modifications to this baseline, including twin propeller/rudders, increased astern power, thrusters, high-lift rudders and thrust vectoring devices. The maneuvering performance was determined from evaluation maneuvers in shallow water, including turns, accelerating turns, coasting turns and stops. Some of the high-lift rudder and thrust vectoring devices were identified as having significant benefits. Suggestions for future efforts are presented.

Introduction

THE changing patterns of oil supply and demand in the United States are resulting in increases in the volume of oil moving in tank vessels in U.S. waters. This has led to both a larger number of vessel movements and an increase in vessel size relative to the waterway dimensions. This growth in tanker traffic and related accidents resulting in oil spills has caused increased concern, culminating in the President's message on tanker safety and various other proposed national and local regulations relating to tanker safety.

A major source of concern is tanker accidents which are classed as collisions, rammings and groundings (CRG) and which almost always occur in restricted waters. Although many of these casualties do not result in oil pollution, CRG-type casualties still do contribute significantly to oil pollution. One study of oil outflow due to tanker accidents indicated that, for a five-year period, about 40 percent of the outflow was due to CRG casualties. Because of the greater probability of total loss of the vessel, groundings accounted for slightly more than half of the outflow due to CRG casualties. In addition, ship speeds are reduced in restricted waters and outside assistance such as tugs is sometimes required. Thus, operations in restricted waters result in both safety problems and direct economic penalties.

There are many factors which affect the safety and economics of tanker operations in restricted waters, including operator skill, navigation systems, vessel traffic services (VTS) and the inherent maneuvering capabilities of the vessel. In many cases CRG casualties are attributed to human error and, as a result, the major research efforts to date have been directed at improving operator skill or providing the operator with more information (for example, collision avoidance radars, and VTS) to reduce the chance of error. Also, considerable study and effort have been devoted to minimizing the effects of such casualties after they occur by structural or arrangement changes to the vessel such as reduction of absolute tank size or the addition of double bottoms.

To date, almost no effort has been devoted to improving the margin for error or reducing casualties by improving the inherent maneuvering capabilities of the vessel. Indeed, little effort has been devoted to determining the influence of inherent maneuvering capabilities on CRG casualties. The potential for benefits from improvements in the inherent maneuvering capabilities of tankers has been recognized in proposed legislation and in the President's message on tanker safety. Research is required to determine the potential benefits from improved inherent maneuvering capabilities and how to best obtain these improvements. This paper presents results from studies directed at these problems. The objectives of the work were to develop a preliminary assessment of the benefits of improved inherent maneuverability of tankers, to develop initial data on the improvements in inherent maneuverability which could be obtained with various concepts and, as a result, to identify the most promising concepts for improving the inherent maneuverability of tankers for additional research and development efforts.

The paper presents the results of an analysis of CRG casualties, a discussion of various concepts for improved controllability, the maneuvering performance of a baseline ship equipped with various concepts based on simulation studies, and a preliminary evaluation of the various concepts.

Analysis of tanker collision, ramming and grounding casualties

There are a number of possible ways in which information on the importance of ship controllability in CRG casualties could be developed. The method chosen was the detailed study of a large number of CRG casualty reports. The objectives of the analysis were to develop an understanding of the importance of casualties which could have been influenced by improved controllability, to identify recurring casualty situations and the kind of maneuvering performance which would effect these situations, and the costs associated with these casualties.

Data sources and method of analysis. Although a number of sources exist for tanker casualty statistics, the U.S. Coast Guard vessel casualty data bank was used as the source of data for the casualty analysis. This data source was selected because it contains the necessary detailed information on a large number of cases. All casualties which occur in U.S. waters or to U.S.-flag vessels in foreign waters are included in this data bank.

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[1] Hydronautics, Inc., Laurel, Maryland. Coauthor Ternes is now with Guralnick Associates, San Francisco.

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Table 1 Types of Controllability needed to reduce CRG-type casualties

1. The ability to maintain control of the vessel after losing one steering/propulsion unit.
2. The ability to slow down while maintaining steerageway in *Y* knots of wind speed and *Z*-knots of current speed.
3. The ability to maintain the heading of the ship as it is affected by ship/bank/bottom suction/sheer at *X* knots of ship speed and in *Y* knots of wind speed and *Z* knots of current speed.
4. The ability to control the heading of the vessel at *X* knots of ship speed and in *Y* knots of wind speed and *Z* knots of current speed.
5. The ability to turn the vessel more sharply with *X* knots of ship speed and in *Y* knots of wind speed and *Z* knots of current speed.
6. The ability of the master to obtain additional tug power in *Y* knots of wind speed and *Z* knots of current speed with *W* number of tugs already assisting.
7. The ability to control the heading of the vessel while backing at *X* knots of ship speed and in *Y* knots of wind speed and *Z* knots of current speed.
8. The ability to stop the vessel from *X* knots of ship speed and in *Y* knots of wind speed and *Z* knots of current speed in *W* minutes.

In addition, two other classifications were defined:

9. No type of controllability would help as casualty was due to operator error.
10. No type of controllability would help as casualty was due to reasons beyond operator or vessel control.

The analysis was carried out by obtaining from the Coast Guard's data bank of vessel accidents a listing of all tanker casualties that occurred as a result of a collision, ramming, or grounding for a five-year period. For the purposes of this study, a tanker is defined as a vessel built or converted to carry large quantities of liquid cargo. This can, and does, include liquid chemical carriers, petroleum products carriers and, in some cases, tankers carrying grain. Tankers with a rated gross tonnage of less than 10 000 tons were not considered. Additionally, a collision is defined as any casualty that occurred between two or more vessels underway. A ramming is defined as any casualty that occurred between a vessel anchored or underway and a dock, buoy, moored or anchored vessel, or any other non-self-propelled object or vehicle. A grounding is defined as any casualty that occurred when a vessel touched the channel bank, bottom or a submerged object. A five-year period of interest was chosen to provide a large data sample upon which to base the analysis. Specifically, the listing included casualties from late 1971 through early 1976. The number of cases that met the above criteria is 835.

The listing was initially reviewed to separate casualties where vessel controllability may have played a major role (Category I) from those where it obviously did not (Category II). Category II included unavoidable casualties, such as groundings due to actual depth being less than charted depth, vessels intentionally grounded, anchors failing to hold, and miscellaneous casualties that occurred for reasons other than vessel controllability. This category also included obvious cases of personnel error.

After the initial review, a more comprehensive study was made of Category I casualties. This involved reading each casualty report and its appended information. During this research, special attention was given to identifying those cases where increased vessel controllability would have, or would most likely have, prevented the casualty. The cases that met this criterion were reproduced for further evaluation. Moreover, those cases which met the criterion but did not contain enough information to warrant further investigation were tabulated.

The final step of the process was a detailed, in-depth study of the selected cases. The major thrust of this phase was to identify typical casualty situations which might have been prevented if improved control capability had been available to the vessel's operator at the time of the casualty. These means of controllability, once discovered, were termed "Required Types of Controllability."

Required Types of Controllability. An important result of the detailed study of the casualty reports was the finding that there are a limited number of types of controllability which apply to almost all CRG casualties in which the vessels' performance capabilities could have influenced the result. These are listed in Table 1.

Before considering each of the types of controllability in Table 1, it is important to define the assumptions made about the role of operator error. In a high percentage of the CRG casualties in the U.S. Coast Guard (USCG) data bank, operator error is given as the primary cause. In this analysis, consideration was given to the stage in the accident sequence at which the operator error occurred. For example, a significant number of the CRG casualties were placed in Classification 9, "No Type of Controllability would help as casualty was due to operator error." This classification includes all of the cases in which operator error continued until so late in the sequence of events that no practical improvement in controllability could have prevented the casualty. Typical examples include navigational errors resulting in groundings, collision in which the operators misinterpreted the situation and thus took incorrect action, and failure to maintain proper lookout.

There are also a significant number of CRG casualties in which an operator error occurs early in the sequence of events, is subsequently recognized, and corrective action taken. Unfortunately, the controllability of the vessel is not sufficient to prevent the casualty. In such cases, in the analysis, the casualty is assigned against one of the eight types of controllability listed in Table 1.

Thus, the potential effects of improvements in vessel controllability in cases in which operator error is the primary cause depend on how soon the error is recognized and the corrective action taken. In general, it was considered that if corrective action were not taken at least two minutes before the casualty, no practical improvement in controllability could have prevented the casualty and it was placed in Classification 9, "No Type of Controllability would help as casualty was due to operator error."

Figure 1 provides an indication of the relative frequency of occurrence of CRG-type casualties when classified in accordance with the types of controllability listed in Table 1. A number of important observations can be made about the results presented in Fig. 1, including:

1. There are a significant number of tanker CRG casualties which could potentially be affected by improved vessel controllability.
2. Casualties in which a human error continues until so late in the sequences of events that no practical improvement in controllability would be useful are fewer in number than cases in which improved controllability could have some effect.
3. Casualties which are not related to human error or vessel control are significant in numbers.

There are typical recurring sequences of events which further clarify and define the types of controllability listed in Table 1. These sequences are obtained from the detailed casualty studies and are shown in Figs. 2–7. Typical sequences could not be defined for Type 1 "Ability to maintain control after losing one steering/propulsion unit" and Type 6 "Ability of the master to obtain additional tug power." Environmental conditions (that is, wind and current) have a significant effect on the occurrence of CRG casualties during the typical sequences shown in Figs. 2–7. In general, moderate or strong currents or winds in excess of 10 knots or both are involved in about two thirds of the casualties. Additional details are provided in reference [1].[2]

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[2] Numbers in brackets designate References at end of paper.

Cost of CRG casualties. In order to determine the approximate cost effectiveness of concepts for improved controllability of tank vessels, it is necessary to develop some idea of the cost of CRG casualties. For this paper the major concern is the casualties which might be influenced by improvements in controllability. The source of data is the approximately 280 CRG casualties studied in detail. Of these, approximately 200 were classed as ones in which improved controllability might have some influence.

There are several problems associated with determining the costs of CRG casualties. The major one is that some consequences of a casualty, such as loss of life or damage to the environment from spilled oil, cannot be adequately expressed in terms of money. For the purpose of this study such consequences will not be considered specifically and only direct costs to the owner will be investigated. This is done with the understanding that, when benefit/cost ratios are calculated, concepts which are only marginal have in fact a positive benefit/cost ratio.

Another problem is that data on the extent of loss reported in the USCG casualty reports are often incomplete. This happens because in many cases the dollar value of the loss is estimated by the person directly involved in the casualty at the time of the casualty. As a result, true estimates of the cost of repairs are not available. Also, in many cases, it is in the interest of the person reporting the cost of damage to minimize the costs.

A further problem is that all of the costs are not reported. Many casualties involve groundings without damage. In such cases the damage reported is zero by definition. However, the vessel is delayed until it is refloated, tugs may be required, inspections are made to determine if damage occurred, etc. There are very real costs associated with these activities but they are not reported.

Given the problems described in the preceding, only an approximate analysis of the costs of CRG casualties could be carried out. The casualty reports sometimes describe damage in terms of the estimated cost to repair or as slight, moderate or severe. To calculate direct costs it was assumed that slight implied $10 000, moderate $50 000 and severe $200 000 dollars in damage. Based on these assumptions Table 2 was prepared, listing the average direct cost for the casualties assigned to each measure of controllability. In this table it was assumed that the true direct costs of a casualty averaged three times the costs reported. Further, it was assumed that an hour of delay time was worth $1000.

Table 2 does not include the costs of the four total losses in the 204 cases considered in detail. These losses add from $40 million to $80 million to the loss totals and add to the average cost per casualty from $200 000 to $400 000. Thus, the overall average cost of a tanker CRG casualty which could be affected by vessel controllability is between $400 000 and $600 000. It is important to note, when considering the average cost of a casualty, that the variation about the average is very large. This is shown by Figs. 8 and 9.

It is also necessary to determine the probability that a vessel will be involved in a CRG casualty. A first approximation to this can be obtained from the casualty occurrences. A total of 835 casualties in a five-year period was considered and 490 of those involved U.S.-flag tankers. During this period there were about 250 U.S.-flag tankers in the size range considered. Thus in a 20-year life a U.S.-flag tanker would, on the average, be involved in about eight CRG casualties. Both for the full sample and the U.S.-flag-only cases, CRG casualties which could be influenced by improved controllability make up about one third of the total (that is, Types of Controllability 1 through 8). For U.S.-flag vessels this amounts to 2.88 such casualties in a 20-year life and, at an average cost of from $400 000 to $600 000 per casualty, this amounts to between $1.15 million and $1.73 million in a 20-year vessel life.

It is of interest to compare the frequency-of-occurrence data presented in the foregoing for U.S.-flag tankers with worldwide averages. Reference [2] reports that in 1969–1970 there were 1416 tanker casualties in a fleet of about 6000 vessels. CRG casualties accounted for about two thirds of the total. Assuming that one third of these could have been affected by vessel controllability, in the worldwide fleet the average vessel would suffer about 1.0 such CRG casualty in a 20-year life. Thus, the average U.S.-flag tanker is involved in about three times as many controllability-related CRG casualties as the world average. This is because the typical U.S.-flag tanker is involved in short voyages with a high percentage of time spent in restricted waters where CRG casualties are likely to occur. This also implies that it would be three times more cost effective to improve the controllability of a U.S.-flag average tanker than a world average tanker because of the way in which they are employed.

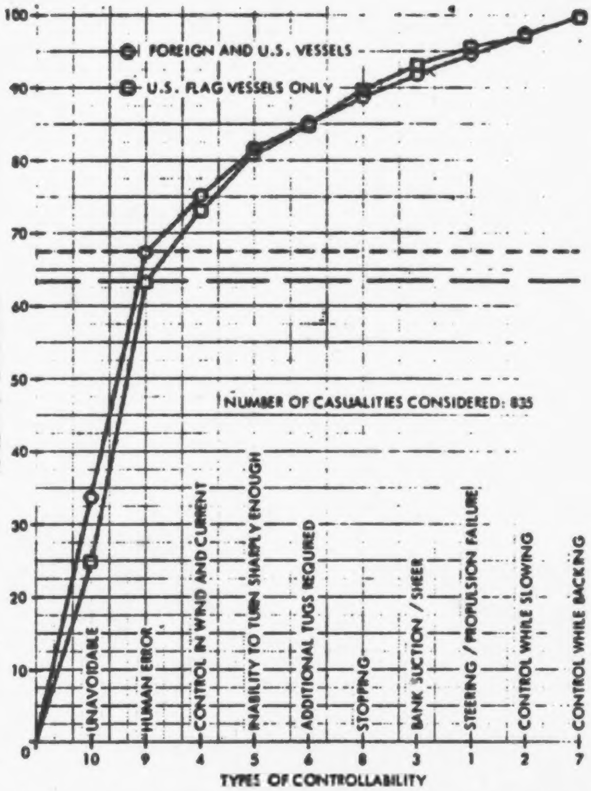
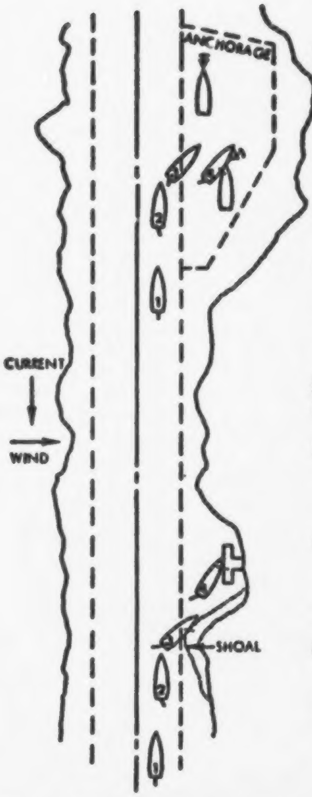


Fig. 1 Cumulative percent of casualties that are represented by each type of controllability

Hydrodynamic conditions for improved controllability

The analysis of CRG casualties presented in the first section of this paper resulted in the definition of eight types of controllability which could effect CRG casualties. Most of these types require the control of ship heading under adverse environmental conditions at slow speeds or during transient conditions such as stopping. A conventional ship with a single propeller and rudder has inherent limitations under such conditions which must be overcome to effect significant improvements in controllability. These limitations can be understood by considering four of the modes of operation a ship undergoes when maneuvering in restricted waters. These are:

1. Going ahead at slow speed with propeller rotating ahead.



Type A

Position 1: Vessel is approaching anchorage and starts to slow.

Position 2: Pilot orders right rudder to enter anchorage. Vessel is still slowing.

Position 3: Vessel starts to drift as it comes more broadside to current.

Position 4: Pilot orders left rudder to counteract current drift. Speed is insufficient to swing bow to left and vessel strikes anchored ship.

Type B

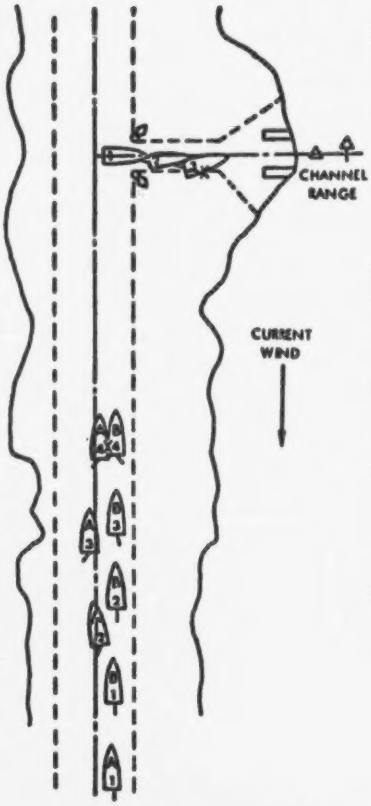
Position 1: Vessel starts to slow to approach dock.

Position 2: Pilot puts on right rudder. As vessel starts to turn, bow is caught by current and starts to drift.

Position 3: Vessel is still slowing. Pilot orders left rudder to counteract current drift. Vessel doesn't respond and grounds on shoal; OR

Position 4: As vessel is,slowing to dock, left rudder is ordered. Speed is insufficient to swing bow to left and vessel strikes dock.

Fig. 2 Typical casualties that occurred when a vessel was unable to maintain its steerageway while slowing



Type A

Position 1: Vessel enters narrow channel to proceed to dock.

Position 2: Current and wind effects force vessel off channel centerline.

Position 3: As vessel nears channel edge, bank suction and shear cause the vessel's bow to swing out and stern to ground.

Type B

Position 1: Vessel A uses VHF communications to contact Vessel B. They agree that A will pass B on B's port side.

Position 2: Vessel A initiates the pass by using left rudder and proceeding to the center of the channel.

Position 3: Vessel A is on channel centerline and starting to overtake Vessel B. B is forced to put right rudder on to maintain course and A uses left rudder to stay clear of B.

Position 4: The suction between Vessel A and Vessel B is strong enough to cause the vessels to collide.

Fig. 3 Typical casualties that occurred when a vessel was unable to maintain its heading as it was affected by ship/bank/sheer/suction

2. Going ahead by inertia with propeller stopped.
3. Going ahead by inertia with propeller rotating astern.
4. Going astern with propeller rotating astern.

In the first mode, the ship has measurable control over heading since the forward speed and the propeller race contribute to the flow over the rudder. The effectiveness of the rudder can be significantly increased by increasing the propeller rpm and thus the race velocity. This has the disadvantage that speed is also increased, which may be undesirable. Conversely, as the propeller rpm is decreased, the rudder effectiveness is reduced and control over heading is reduced.

In the second mode, flow over the rudder is due only to the ship's forward speed and at the rudder the flow is reduced by the hull's viscous wake and the sheltering effect of the stopped propeller. In this mode the rudder can control the heading down to very low speeds as long as the environmental forces due to wind and current are small. However, since the hydrodynamic lift forces on the hull and rudder decrease as speed squared, environmental forces eventually become important.

In the third mode, the race effect of the propeller counters the forward speed of the ship and there is no flow over the rudder. The rudder thus cannot control the heading and there is a turning moment due to the propeller. For a normal right-handed propeller this moment acts to starboard and is particularly significant in shallow water.

In the fourth mode the flow over the rudder is also very small. Most single-screw ships cannot be controlled by the rudder when going astern.

Thus, if significant improvements are to be made in controllability, it will be necessary to develop control forces and moments regardless of the direction of propeller rotation.

Concepts for improved controllability

Method of approach. Over the years a large number of ideas have been proposed to improve the controllability of ships. The available literature was reviewed and the basic concepts which would be practical and applicable to tankers were identified for further analysis. Some of the concepts selected are given in Table 3.

The approach adopted to define the performance of these concepts was to conduct simulation studies of maneuvers of a baseline ship equipped with each concept and to compare the results with the conventional single-propeller/single-rudder arrangement. The simulations were carried out using a computer program developed by Hydronautics, Inc. This program is based on the equations of motion described in reference [1]. In order to implement this approach it was necessary to develop a mathematical model for a baseline ship equipped with each of the concepts. Because of the availability of data, one of the hulls from the Maritime Administration (MarAd) full-form hull series was selected for the baseline ship. The series is described in references [3,4]. The specific hull selected was Model E, which has the characteristics given in Table 4.

This hull form was considered reasonable for the purposes of the study since its proportions were suitable for a design intended to carry maximum deadweight in restricted-depth water. For most of the simulation studies, a nominal displacement of 100 000 tons was selected for the baseline ship. This size was selected since it is representative of the size of new tankers which may be constructed for service to U.S. ports, which, in general, have relatively shallow water.

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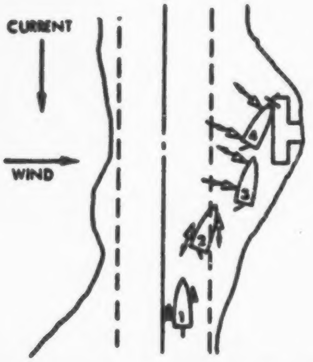


Type A

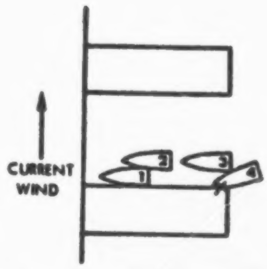
Position 1: Vessel stops to pick up tugs prior to docking.

Position 2: Vessel initiates turn into the dock with both tugs and vessel going ahead slow.

Position 3: Pilot shifts bow tug to port side and backs it. Stern tug pushes. Rudder is left. Vessel starts to experience difficulty in turning into current.

Position 4: Despite tugs and rudder action, current pushes bow onto pier.

Fig. 4 Typical casualty that occurred when a vessel was unable to maintain its heading

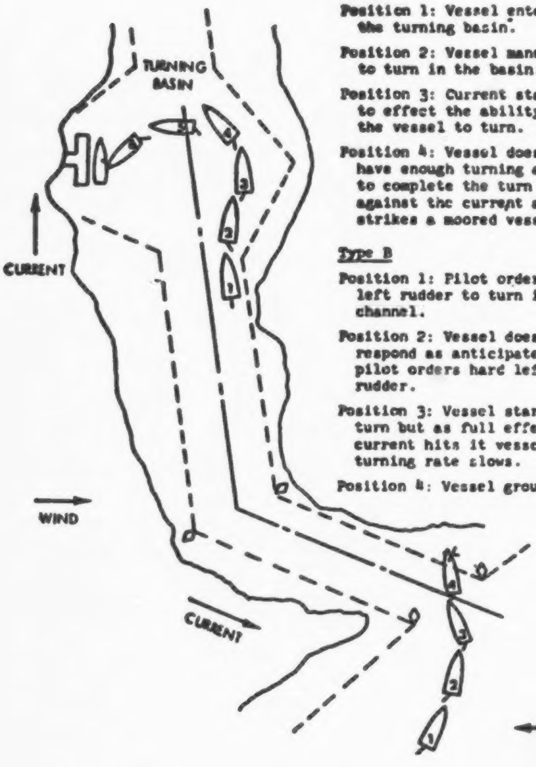


Position 1: Vessel casts off all lines and starts backing from the slip.

Position 2&3: Vessel is pushed from dock by effects of wind and current.

Position 4: As vessel's stern emerges from protection of the dock, it is swung by the current, causing the bow to strike the dock.

Fig. 6 Typical casualty that occurred when a vessel was unable to control its heading while backing



Type A

Position 1: Vessel enters the turning basin.

Position 2: Vessel maneuvers to turn in the basin.

Position 3: Current starts to effect the ability of the vessel to turn.

Position 4: Vessel does not have enough turning ability to complete the turn against the current and strikes a moored vessel.

Type B

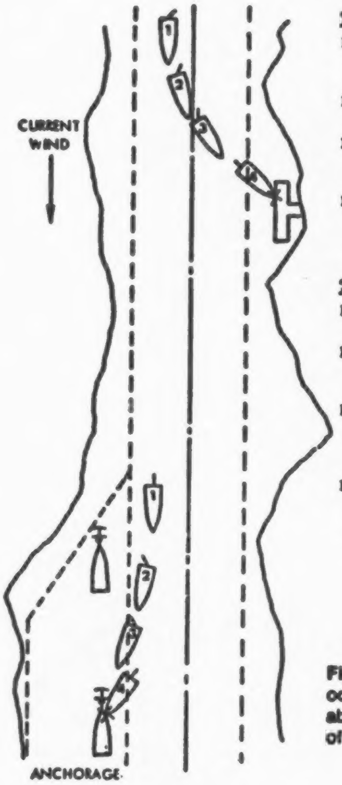
Position 1: Pilot orders left rudder to turn into channel.

Position 2: Vessel does not respond as anticipated so pilot orders hard left rudder.

Position 3: Vessel starts to turn but as full effect of current hits it vessel turning rate slows.

Position 4: Vessel grounds.

Fig. 5 Typical casualties that occurred when a vessel was unable to turn more sharply



Type A

Position 1: Vessel prepares to dock. Left rudder is given.

Position 2: Vessel starts to turn.

Position 3: Pilot realizes that vessel has too much way on. Orders back bell.

Position 4: Pilot orders full back and rudder amidships. Vessel strikes dock before it can stop.

Type B

Position 1: Vessel prepares to enter anchorage.

Position 2: Right rudder is given and vessel starts to turn.

Position 3: Pilot realizes that turn rate is slowed due to current and orders hard right.

Position 4: Pilot orders full back and rudder amidships. Vessel strikes anchored vessel before it can stop.

Fig. 7 Typical casualties that occurred when a vessel was unable to stop in a short amount of time

Table 2 Costs of CRG tanker casualties

	Average Direct Reported Cost	Probable Average Direct Cost	Average Delay Time, hr	Overall Average Cost to Owner per Casualty
1. Control after steering of propulsion failure	18 500	55 500	56	111 500
2. Ability to slow down and maintain control	44 000	132 000	64	196 000
3. Ability to maintain control bank suction/sheer	18 000	54 000	67	121 000
4. Ability to maintain control in wind and current	31 000	93 000	86	179 000
5. Ability to turn more sharply in wind and current	35 000	105 000	36	141 000
6. Ability to obtain additional tug power	41 000	123 000	34	157 000
7. Ability to maintain control when backing	36 000	108 000	70	178 000
8. Ability to stop more quickly	202 000	606 000	351	957 000
Overall average for CRG casualties which could be affected by vessel controllability	47 700	143 000	88	231 000

NOTE: This table does not include the four total losses in 204 casualties. The four total losses were assigned to the following measures of controllability:[5]

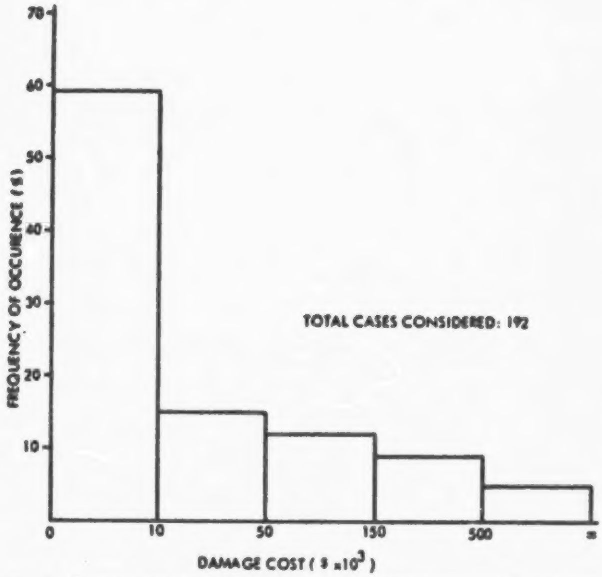


Fig. 8 Damage cost as a function of frequency of occurrence for all types of controllability

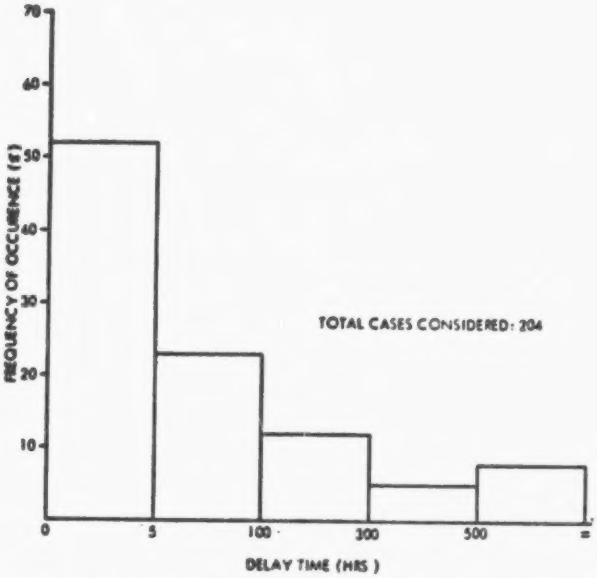


Fig. 9 Delay time as a function of frequency of occurrence for all types of controllability

The hydrodynamic data used in the analysis of the baseline ship, the twin-screw/twin-rudder, steering Kort nozzle, and kitchen-rudder concepts were obtained from model tests. These tests included a complete series of captive model tests in shallow water (H/T = 1.2) at the Hydronautics Ship Model Basin using a Large Amplitude Horizontal Planar Motion Mechanism (LAHPMM). Figure 10 shows the test setup. Resistance and propulsion tests were carried out in deep water. The details of the model tests and the complete results are given in references [1,3,4,5]. The hydrodynamic data used in the analysis of the other concepts were based on published data.

As indicated in Table 3, a number of concepts were evaluated to determine their potential effects on tank vessel controllability. This section provides a brief description of each of these concepts. The details relating to the hydrodynamic performance and mathematical modeling of each of the concepts are presented in references [1,5].

Twin rudders, twin propellers. A short feasibility study was carried out to define a twin-screw configuration based on the single-screw baseline form. The resulting conversion of the single-screw Model "E" to a twin-screw/twin-rudder arrangement is shown in Fig. 11.

The propulsion test data indicated that this twin-screw concept is at a significant disadvantage relative to the single-screw configuration. The ratio of power required at a nominal 16-knot speed is 1.25. This is significantly higher than expected and is due to the larger thrust deduction (small $1-t$) and higher wake fraction (smaller $1-w_t$) than expected. Although the hull efficiency is about as expected (approximately 0.95) the propeller loading is significantly higher and thus propeller efficiency is low. This indicates the need for a larger propeller diameter and a relocation of the propeller or modification to the lines to reduce the thrust deduction. If this were done, it might be possible to reduce the ratio of power required by a twin-screw arrangement relative to a single-screw arrangement to about 1.16. A completely different arrangement based on twin skegs may do better relative to the single-screw baseline. Assuming a power ratio of 1.16, the relative capital cost of a twin-screw arrangement was estimated to be 1.03 times the single-screw baseline and the required freight ratio (RFR) would be about 1.07.

Increased astern power. The concept of increased astern power may be useful in that stopping distance and time would be reduced. In typical steam turbine plants, the astern turbine is capable of generating about 35 percent of ahead power at about 70 percent of ahead rpm. For the purpose of this study it was assumed, as an upper limit, that the astern power would be in-

Table 3 Concepts evaluated for improved controllability

1. Conventional single propeller and rudder, baseline ship
2. Twin propellers and rudders
3. Increased astern power
4. Maneuvering propulsion devices, including
   - tunnel thrusters
   - active rudder
5. High-lift rudders, including
   - flapped rudders
   - rotating cylinder rudder
6. Thrust vectoring devices, including
   - steering Kort nozzle
   - kitchen rudder

Table 4 Characteristics selected for baseline ship [a]

NONDIMENSIONAL	
length/beam ratio	$L/B = 5$
beam/draft ratio	$B/T = 3$
block coefficient	$C_B = 0.85$
midship area coefficient	$C_X = 0.994$
location of center of buoyancy	LCB = 2.5% fwd
rudder area/profile area	$A_R/A_p = 0.0246$
propeller diameter/draft ratio	$D/T = 0.593$
DIMENSIONAL	
length between perpendiculars	675.9 ft (206.0 m)
breath	135.2 ft (41.2 m)
draft	45.1 ft (13.7 m)
approximate deadweight displacement	84 000 tons [b]
full-load displacement	100 000 tons
shp at 16-knots service speed	18 000

[a] Based on MarAd full-form series Model "E."
[b] 1 dwt = 1.016047 metric tons.

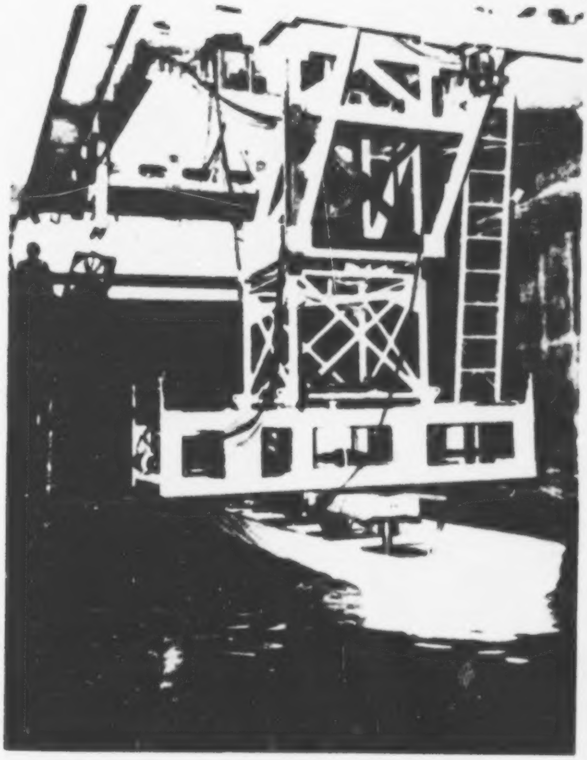


Fig. 10 Photograph of model during LAHPMM tests in shallow water

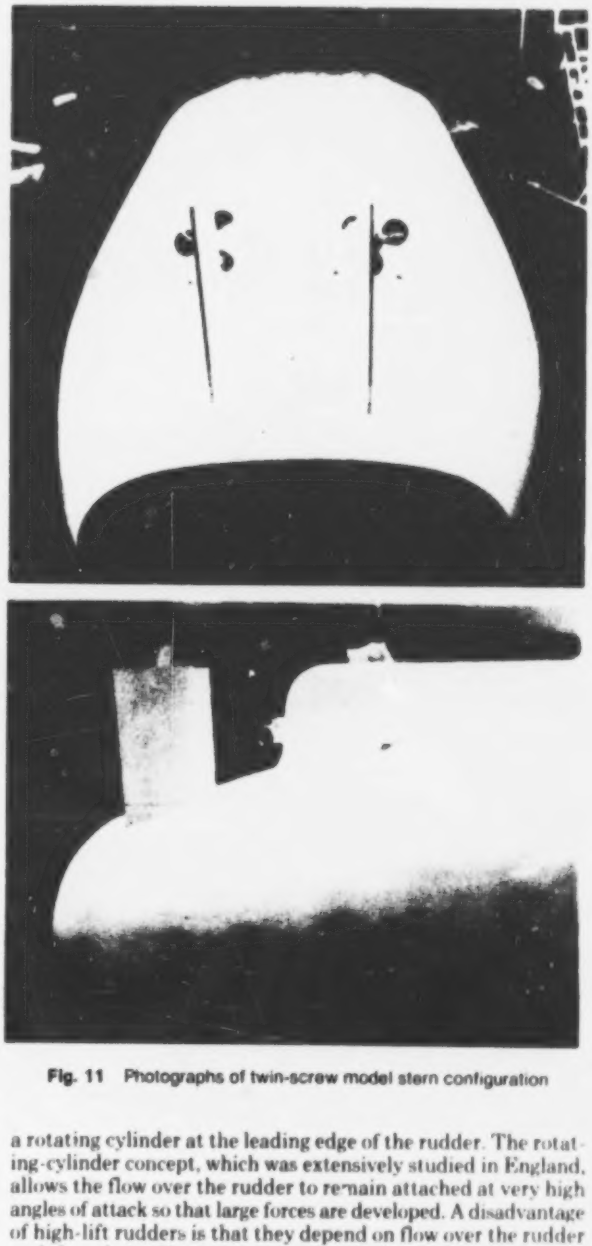


Fig. 11 Photographs of twin-screw model stern configuration

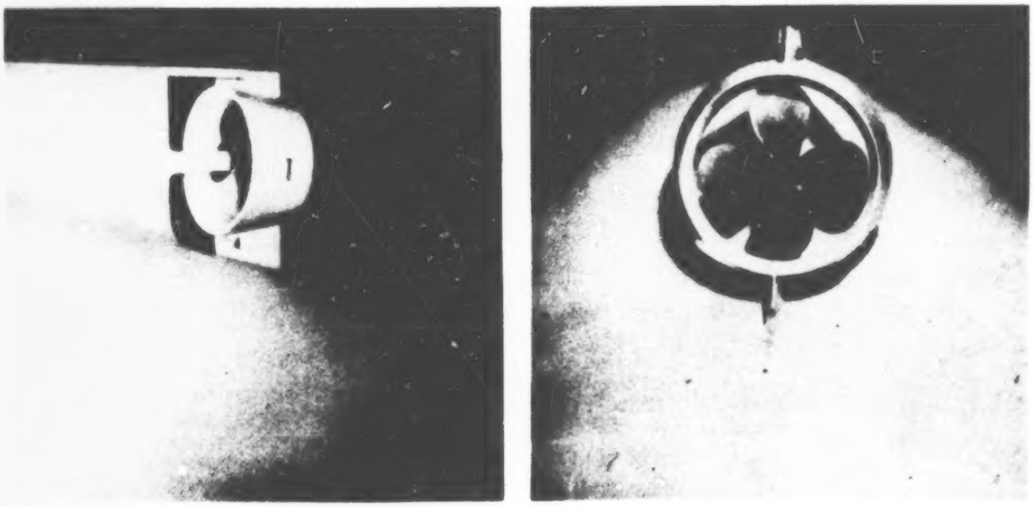
creased to approximately equal the ahead power. This has the potential benefit of increasing astern thrust and, therefore, reducing stopping time. The impact of increased astern power on the propulsion machinery was not studied in any detail. The size of the turbine would have to be increased and additional boiler capacity would be required. Based on these considerations it was estimated that the capital cost would be increased to 1.07 and the RFR to 1.03 relative to the 100 000-ton displacement baseline ship. The technical implications of increased astern power are discussed in reference [6].

Maneuvering propulsion devices. A wide range of maneuvering propulsion devices have been proposed and installed on ships. The two types considered in this study were the conventional tunnel thruster, which is widely used, and the active rudder.

The active rudder consists of a submerged electric motor mounted on the rudder and driving a small propeller in a Kort nozzle. This concept is well known but not widely used. The advantage of maneuvering propulsion devices is that their effectiveness does not depend directly on the direction and speed of the main propeller rotation. It is true, however, that their effectiveness does depend on forward speed with effectiveness decreasing with increasing speed. It was estimated that a tunnel thruster system installed on the baseline ship would increase the capital cost 1.004 and the RFR 1.0017 relative to the baseline ship. The costs for an active rudder were assumed to be similar.

High-lift rudders. Control over the heading of a vessel can be improved by increasing the forces and moments generated by the rudder. This results in the consideration of various types of high-lift rudders. The concepts considered in this study included flapped rudders using both mechanical flaps and jet flaps and a rotating cylinder at the leading edge of the rudder. The rotating-cylinder concept, which was extensively studied in England, allows the flow over the rudder to remain attached at very high angles of attack so that large forces are developed. A disadvantage of high-lift rudders is that they depend on flow over the rudder and thus their effectiveness is reduced when flow velocities are small (that is, when the propeller is stopped or going astern). For the purposes of this study it was assumed that all of the high-lift rudder concepts would involve about the same amount of complexity and cost. The estimated capital cost ratio was 1.003 and the RFR ratio 1.0013 relative to the baseline ship.

Thrust vectoring devices. Thrust vectoring devices are intended to control the heading of a vessel by directing the propulsion thrust. The concepts considered included a steerable Kort nozzle and the so-called kitchen rudder. The steerable Kort nozzle is a cross between a high-lift rudder and a thrust vectoring device. It is effective when the propeller is rotating ahead or astern and retains limited effectiveness when the propeller is stopped. The steerable Kort nozzle has the further advantage that the propulsive efficiency is slightly improved. Based on the



PROFILE VIEW

STERN VIEW

Fig. 12 Photographs of HSMB Model 7905-1 fitted with steering Kort nozzle

model tests, this improvement in propulsive efficiency reduces the average required power (full load and ballast) about 2.4 percent. Figure 12 shows the conversion of the single-screw model to the steering Kort nozzle configuration.

The kitchen rudder is an unusual device in that it is a cross between a steerable nozzle and a bucket-type thrust reverser. The modes of operation are shown in Fig. 13 along with photos of the model. In concept, the propeller rotates ahead at all times and zero or reverse thrust is obtained by closing the rudder. Since the rudder can be rotated, control of heading can be maintained independent of net thrust or its direction. The major disadvantage of this concept is the unknown structural problems associated with an installation of a size suitable for the baseline vessel. The model tests showed an average 1.6 percent savings in power.

In order to further understand the performance of the thrust vectoring device concepts it is useful to compare the basic control forces generated. Figures 14–16 present the yawing moment, N', generated by the baseline rudder, the steering Kort nozzle and kitchen rudder as a function of rudder angle for three operational conditions. Figure 14 is for normal ahead operation. The baseline rudder is most effective at small angles because of its larger area. Due to its large angle at stall, the steering Kort nozzle can generate about 10 percent greater turning moments at maximum rudder angle. Figure 15 applies to the condition of low ship speed and high propeller rpm such as exist during an accelerating or kick turn. Both of the thrust vectoring devices are significantly more effective than the baseline rudder. Figure 16 applies to the condition of ahead ship speed and high astern rpm's or, for the kitchen rudder, a closed condition and ahead rpm's. The conventional rudder generates almost no control force. Both of the thrust vectoring devices are effective with the kitchen rudder giving about twice the moment of the steering Kort nozzle.

The net thrust available to stop the vessel is also of significance. The model tests show that at an η of -3 (say 3 knots ahead speed and full astern rpm) the steering Kort nozzle generates almost 30 percent more stopping force then the conventional arrangement. The closed kitchen rudder at η of -3 generates about 50 percent more stopping force than the conventional arrangement. This is most significant since with the kitchen rudder the full ahead power is available because the direction of propeller rotation is not changed. A ship equipped with a kitchen rudder will have greatly improved stopping performance.

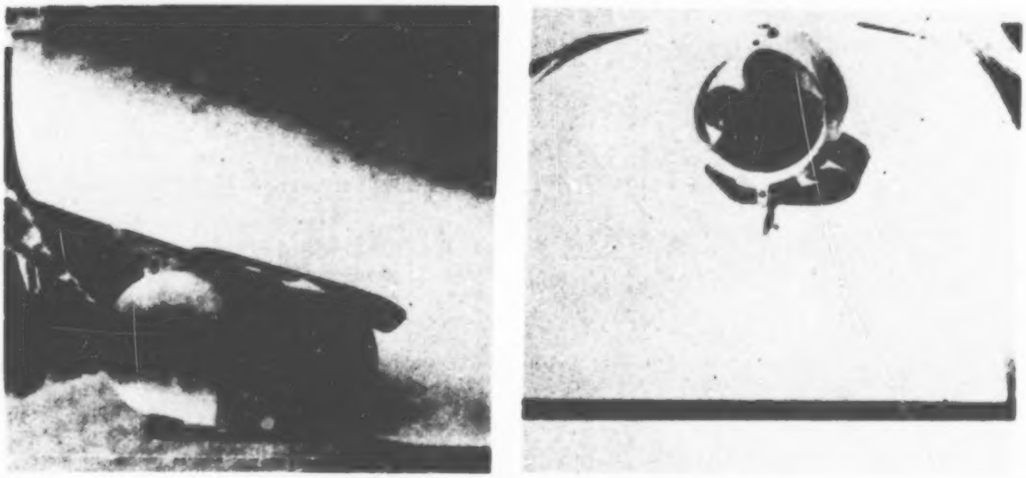
Estimates were made of the effects of the thrust vectoring concepts on capital cost and RFR of the baseline vessel. The results were:

	Kitchen Rudder	Steerable Kort Nozzle
Capital cost ratio	1.008	1.004
RFR ratio	0.996	0.993

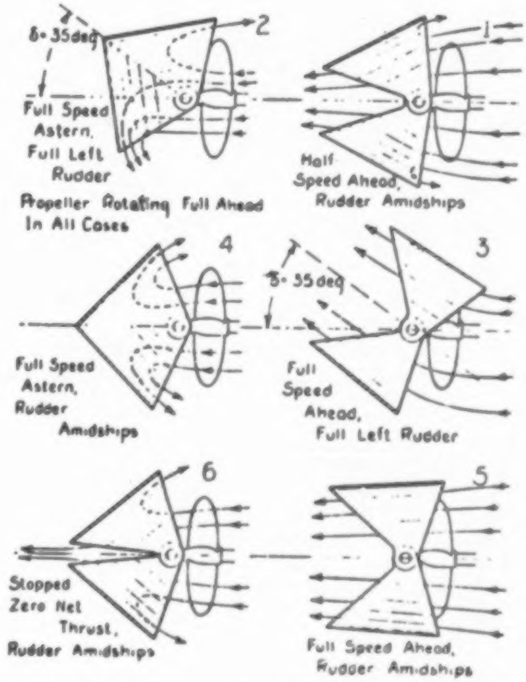
Maneuvering performance with concepts for improved controllability

Evaluation maneuvers. In order to illustrate the effectiveness of various concepts for improved controllability, it is useful to define maneuvers which demonstrate performance and which are related to the types of controllability identified from the casualty analysis. On this basis, a number of controllability evaluation maneuvers were defined; see Table 5. The relationship between these controllability evaluation maneuvers and the types of controllability identified in the CRG casualty analysis is defined by the matrix presented in Table 6.

Maneuvering performance. As indicated in previous sections, the effect of each of the concepts for improved controllability on maneuvering performance was quantified by simulation studies. A series of controllability evaluation maneuvers was defined, as listed in Table 5, and the baseline ship equipped with each concept was run in these maneuvers. All maneuvers were based on shallow water with a depth-to-draft ratio of 1.2. The resulting trajectories are presented in Figs. 17 through 23. There is one figure for each maneuver and the results for all concepts of interest are presented. The performance of the baseline ship is presented for reference in each figure. The results of the steady turning maneuvers are presented in Fig. 17. The rotating cylinder rudder has the best performance followed by the steerable Kort nozzle, kitchen rudder, and jet flap rudders. The ability of the twin-screw configuration to maneuver with only one rudder and propeller operational is also illustrated. Figure 18 presents the results of the accelerating turns. Again, the rotating cylinder rudder, steerable Kort nozzle, and kitchen rudder have the best performance. The use of a bow thruster significantly reduces the headreach during the portion of the turn when speed is low. It has much less effect on the tactical diameter. The results of the coasting turning maneuver are presented in Figure 19. Relative



Photographs of Model 7905-1 fitted with kitchen rudder


δ = 35deg
2
1
Full Speed Astern, Full Left Rudder
Half Speed Ahead, Rudder Amidships
Propeller Rotating Full Ahead In All Cases
4
3
δ = 35deg
Full Speed Astern, Rudder Amidships
Full Speed Ahead, Full Left Rudder
6
5
Stopped Zero Net Thrust, Rudder Amidships
Full Speed Ahead, Rudder Amidships

Schematic flow and operating diagrams for a kitchen rudder

Fig. 13 Kitchen rudder arrangement

to other turning maneuvers, performance is greatly reduced. Figure 20 presents the results of the stopping turning maneuvers for an approach speed of 8 knots. In general, the thrust vector-concepts, that is, the steerable Kort nozzle and the kitchen rudder, have the best performance. The results of the normal 20–20 zigzag maneuvers are presented in Fig. 21. Figure 22 presents the results of the coasting zigzag maneuvers.

Figure 23 presents the results of the stopping maneuvers. The results for stopping maneuvers from speeds of 8 and 4 knots are shown. The kitchen rudder significantly reduces the headreach during a stop.

Evaluation of concepts

At this time it is not possible to make a definitive prediction of the effect of an improvement in ship controllability on the CRG casualty rate. It is useful, however, to make some first-order estimates which can give some feel for which concepts for improved controllability are most likely to be cost effective.

Based on the information presented in the first section of this paper, it was shown that an average U.S.-flag tanker could be expected to be involved in about three CRG casualties in a 20-year life in which improved controllability might be helpful. Table 2 shows that the average total cost of these casualties will be about $0.6 million, neglecting inflation and not discounting to present worth. This does not include the costs associated with the major catastrophies, which for the time period covered occurred once in each 50 incidents. Assuming an average of three CRG casualties in a 20-year life, the costs of these major catastrophies add an additional average total cost of about $3.5 million for the baseline 84 000-dwt ship (that is, $3 \times \frac{1}{50} \times$ value of ship). This gives an average total cost of about $4.1 million for a ship lifetime for CRG casualties in which improved controllability might be helpful. This is about 6 percent of the initial cost of the ship and about 1 percent of the total life-cycle costs.

Thus, based on a rather narrow benefit/cost ratio concept, improvements in controllability that increase ship cost 6 percent or life-cycle costs 1 percent are not justified, but improvements that increase ship cost 1 or 2 percent and life-cycle costs $\frac{2}{10}$ or $\frac{3}{10}$ of a percent may be justified. Using these groundrules, the concepts considered in this study could be evaluated as follows:

Positive benefit/cost ratio:

- Thrust vectoring devices including steering Kort nozzles and kitchen rudder.
- High-lift rudders.

Once developed, the thrust vectoring devices will have acceptable initial costs and will reduce life-cycle costs due to their favorable effects on propulsion performance. They will also have the greatest effect on the CRG casualty rate because of significant improvements provided in low-speed control, control while slowing down and, for the kitchen rudder, reduction in stopping distance. High-lift rudders have very small impact on initial and life-cycle costs. They will have a much smaller effect on the CRG

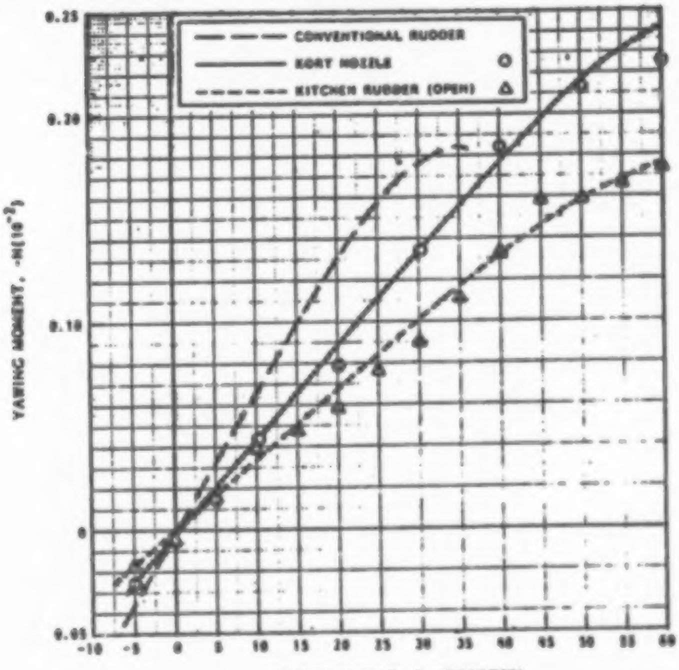


Fig. 14 Rudder and yawing moment comparison at ship propulsion point $\eta = 1$

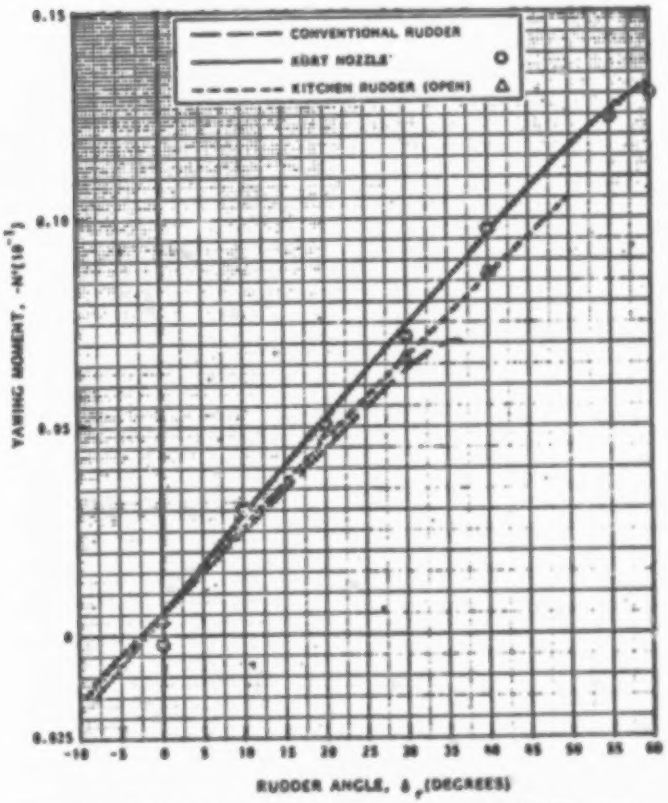


Fig. 15 Rudder yawing moment comparison at a propulsion ratio $\eta = 4$

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rate than thrust vectoring devices since they improve only low-speed control and not control while stopping or stopping distance.

Marginal benefit/cost ratio:

- Maneuvering propulsion devices, including tunnel thrusters and active rudders.

These devices are well developed and have incremental costs which should be acceptable. However, their effect on the CRG casualty rate will be small since they are effective only at low forward speeds. Such devices may well be justified for operational reasons for vessels which have to maneuver unassisted around piers or up to moorings.

Negative benefit/cost ratio:

- Twin propellers and rudders.
- Increased astern power.

The twin-propeller and rudder concept will unacceptably increase the initial and life-cycle costs of the vessel relative to the impact on the CRG casualty rate. With proper design, this concept is effective in the event of a propulsion or steering system failure. For other maneuvering situations, however, there is little improvement compared with the single-screw baseline. Significantly increased astern power for a steam turbine-driven vessel would have too high an initial cost relative to the number of CRG casualties in which increased astern power alone would be useful. Some consideration should be given to low-cost control systems and hardware changes which would minimize the response time to an astern command.

Concluding comments

The importance of tanker accidents classed as collisions, rammings and groundings has been recognized for some time. A number of research programs and studies have been directed at the reduction of the casualty rate, or at reducing the consequences of a casualty. In the course of these efforts, almost no consideration has been given to reducing the casualty rate by improvement in the inherent ship controllability. The rationale is that human error is responsible for most of these casualties. The casualty analysis described in this paper showed that human error is a factor in many cases but that often corrective actions are taken soon enough that improvements in controllability

(*text continued on page 381*)

Table 5 Controllability evaluation maneuvers

- Turn at approach speed of 8 knots with maximum control forces.
- Accelerating turn with maximum control forces at approach speed of 2 knots and rpm's for 12 knots.
- Coasting turn with maximum control forces at approach speed of 8 knots and zero propeller rpm.
- Stopping turn with maximum control forces at approach speed of 8 knots and normal astern rpm's.
- Normal 20-20 zigzag maneuver at approach speed of 8 knots.
- Coasting zigzag maneuver with maximum control forces and 10-deg course change at approach speed of 8 knots.
- Stopping zigzag maneuver with maximum control forces and 10-deg course change at approach speed of 8 knots.
- Crash-stop maneuvers at approach speeds of 8, 4, and 2 knots.
- Turning maneuvers after loss of steering gear.

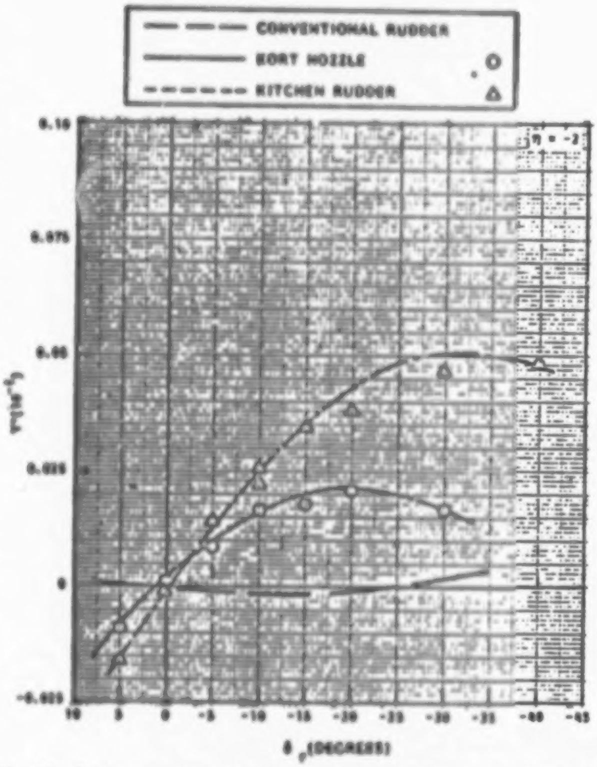
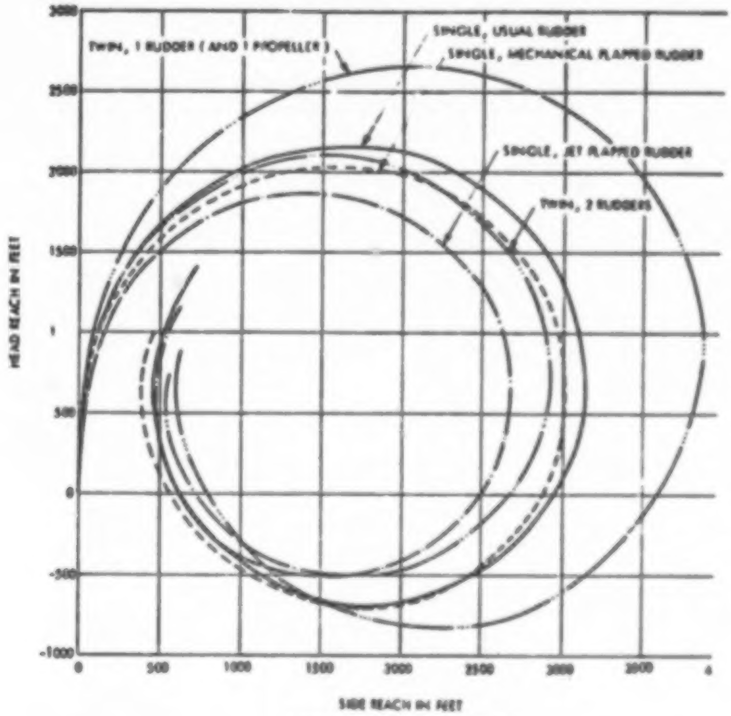


Fig. 18 Rudder sway force and yawing moment comparison at astern thrust propulsion ratio $\eta = -2$

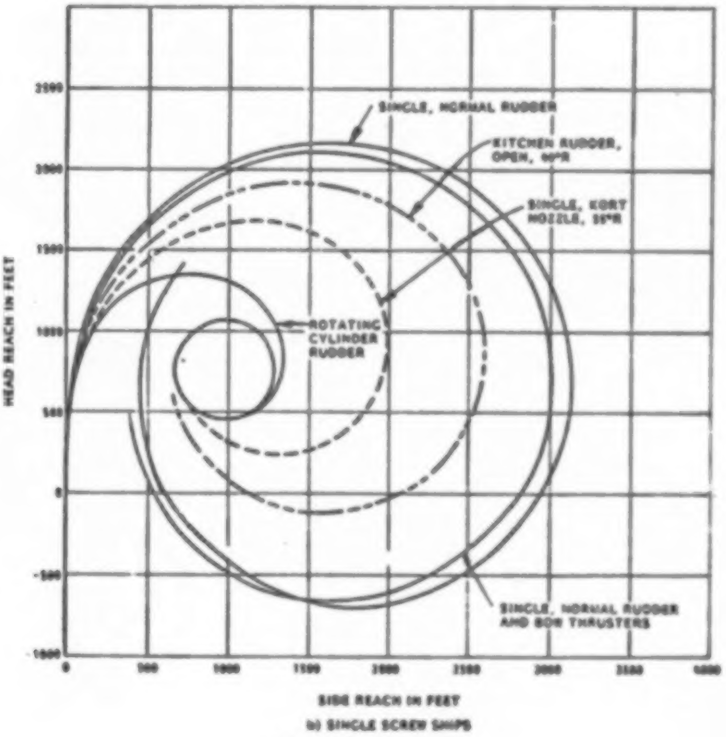
Table 6 Relationship between controllability evaluation maneuvers and types of controllability

Type of Controllability	Normal Turn	Accelerating Turn	Coasting Turn	Stopping Turn	Normal Zigzag	Coasting Zigzag	Stopping Zigzag	Crash Stop	Turning After Loss Steering
Figure No.	19	20	21	22	23	24	25	26	27
1. Ability to maintain control after									
a. steering failure	...	...	...	...	...	...	...	...	X
b. propulsion failure	...	...	X	...	...	X	...	...	...
2. Ability to slow down and maintain steerageway	...	...	X	X	...	X	X	...	...
3. Ability to maintain control when affected by bank suction/sheer	X	X	...	...	X	...	...	...	...
4. Ability to maintain heading control in wind and current	X	X	X	X	X	X	X	...	...
5. Ability to turn more sharply in wind and current	X	X	...	...	...	...	...	...	...
6. Ability to obtain additional tug power	...	...	...	...	...	...	...	...	...
7. Ability to maintain control while backing	...	...	...	X	...	...	X	...	...
8. Ability to stop more quickly	...	...	...	...	...	...	...	X	...



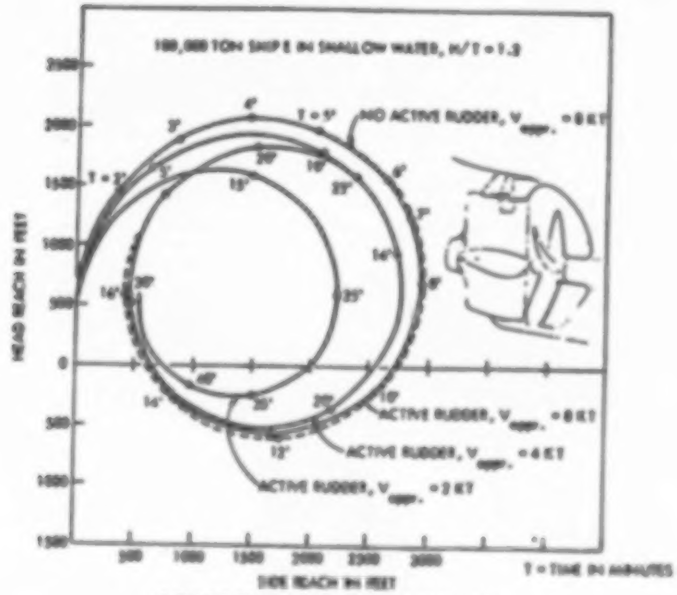
a) SINGLE AND TWIN SCREW SHIPS

Fig. 17 Comparison of paths during a maximum-performance starboard steady turn for the baseline ship and alternative concepts for improved controllability



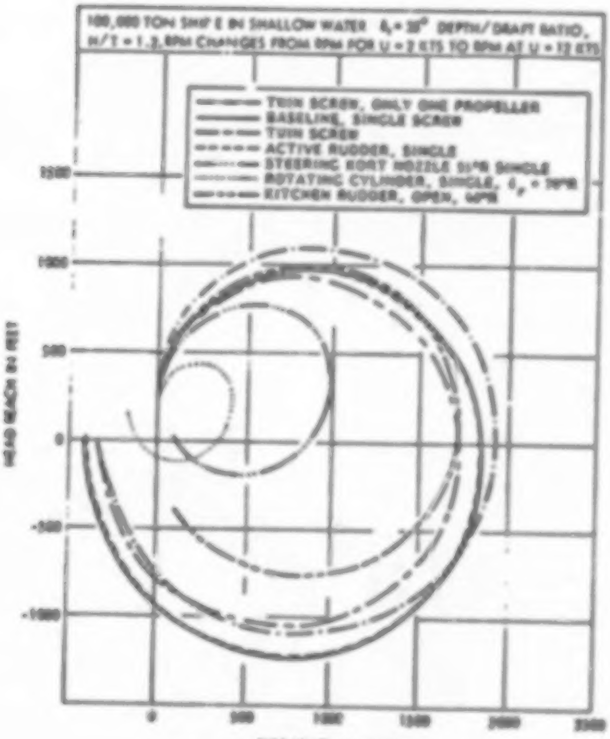
b) SINGLE SCREW SHIPS

Fig. 17 *(Continued)*



c) SINGLE SCREW SHIP WITH ACTIVE RUDDER

Fig. 17 (Continued)



COMPARATIVE TURNING CIRCLES

Fig. 18 Accelerating turn maneuvers for selected devices

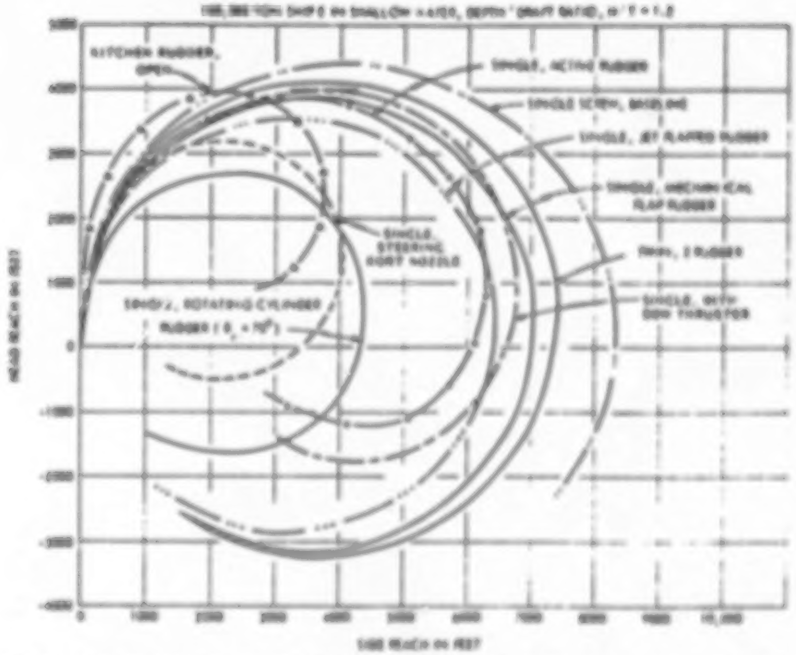


Fig. 19 Comparison of paths during 35-deg starboard coasting turning maneuvers with different propeller/rudder arrangements

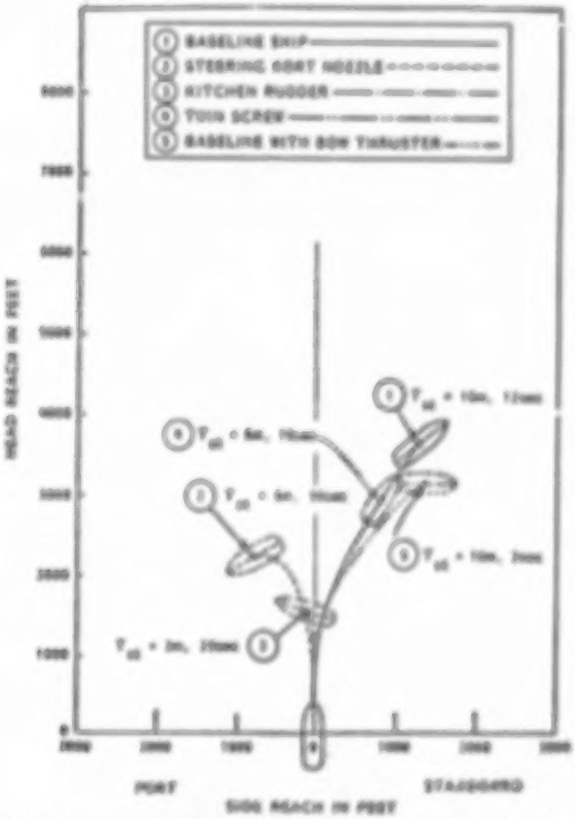


Fig. 20 Comparison of paths during stopping turning maneuvers in shallow water: depth/draft ratio = 1.2; approach speed = 8 knots; maximum rudder angle

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[redacted]

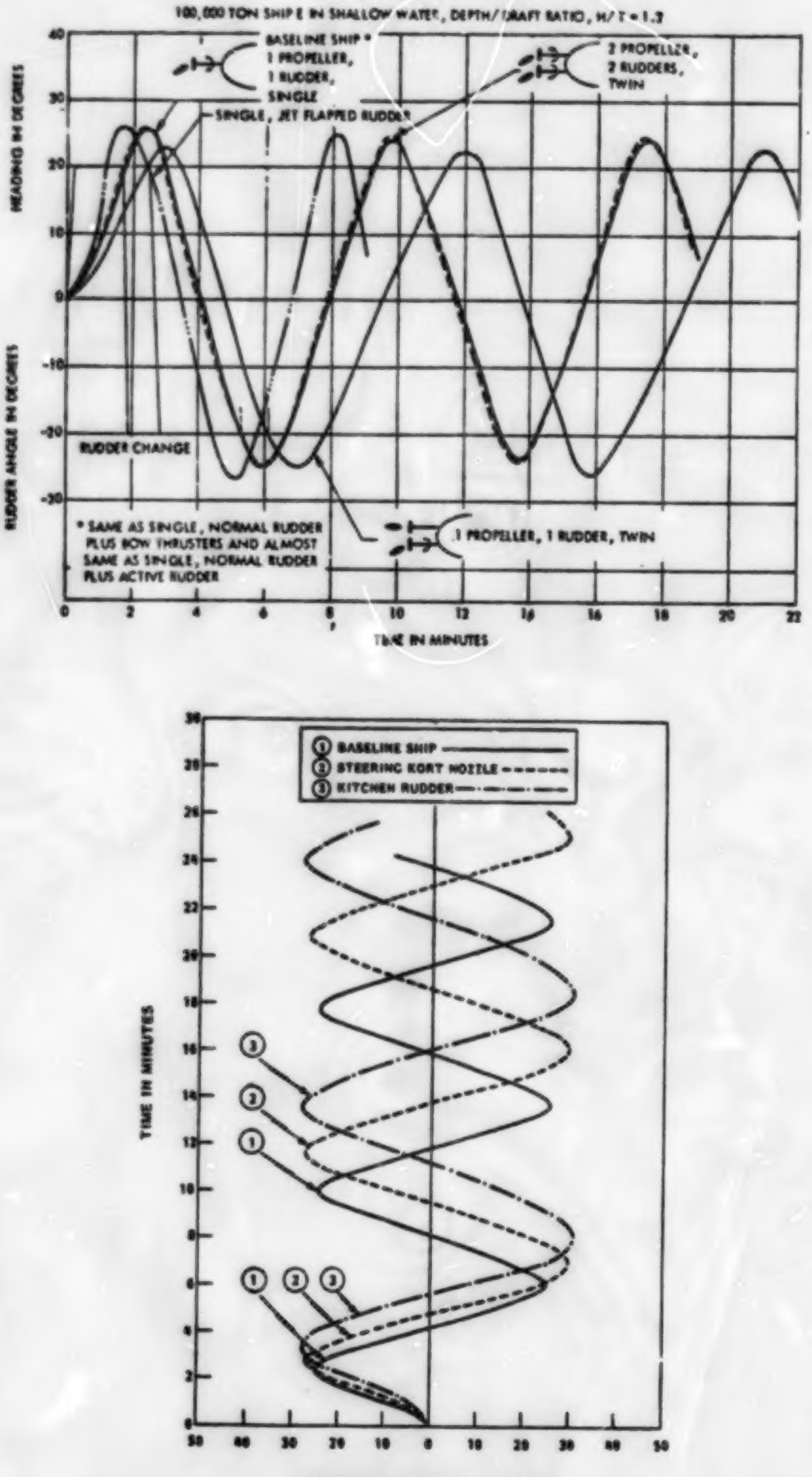

Fig. 21 Time histories of 20–20 zigzag maneuvers for different rudder/propulsion arrangements

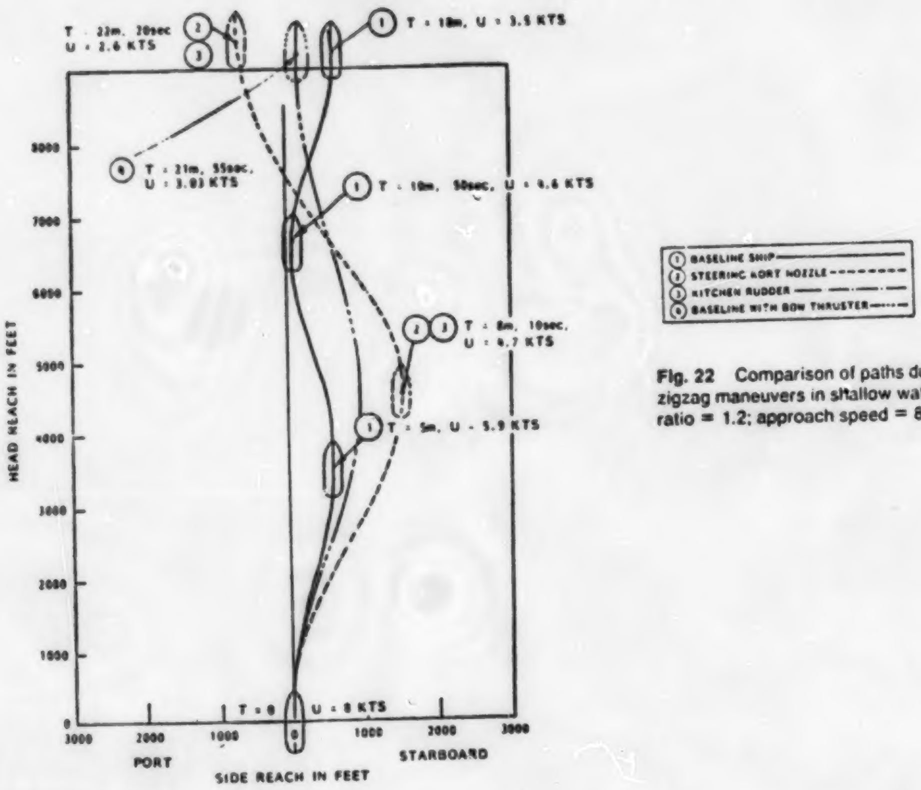

Fig. 22 Comparison of paths during coasting zigzag maneuvers in shallow water: depth/draft ratio = 1.2; approach speed = 8 knots

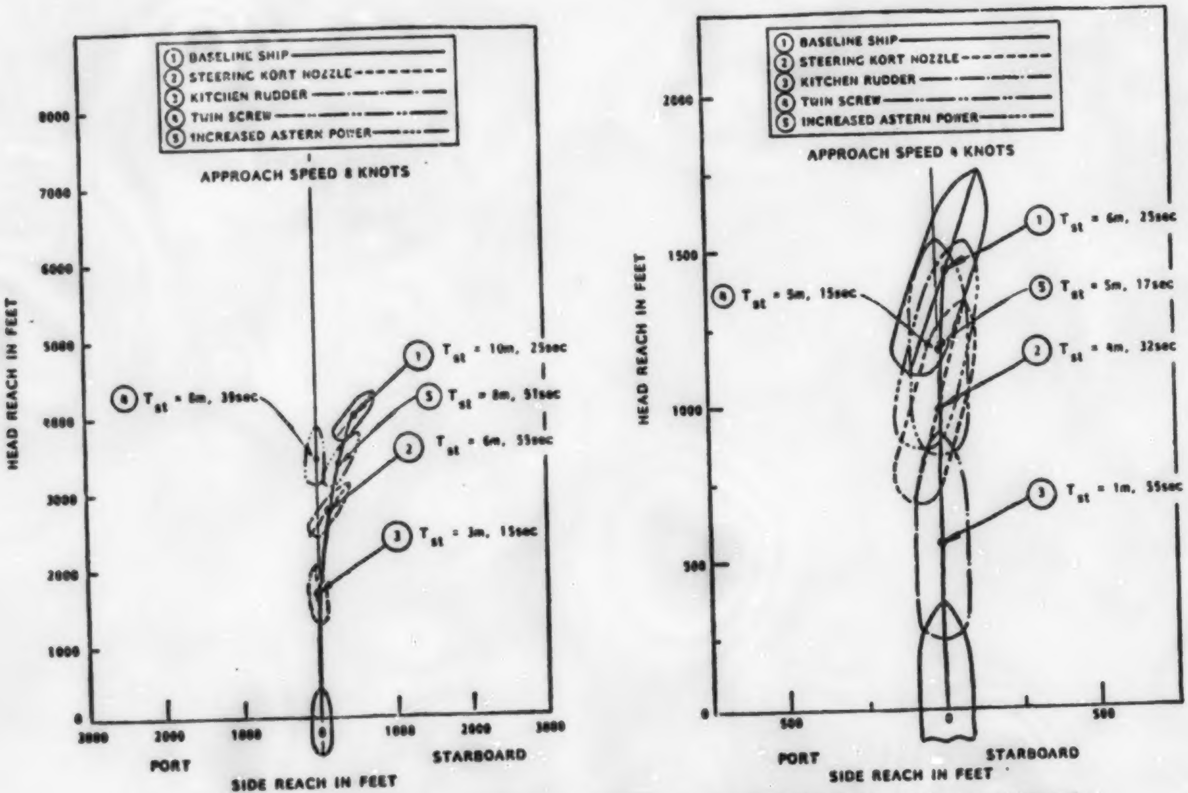

Fig. 23 Comparison of paths during stopping maneuvers in shallow water: depth/draft ratio = 1.2; zero rudder angle

would be of value. The casualty analysis also showed that there are typical casualty sequences that tend to occur and that these involve ship control at low speeds in restricted waters with wind and current acting. Based on this, various types of controllability were identified.

The effect of various devices and concepts on the inherent controllability of a baseline vessel was also determined. Simulation studies of various evaluation maneuvers were carried out using data from model tests and analysis. The evaluation maneuvers were developed based on the various types of controllability identified in the casualty analysis. The results of the simulation studies showed that significant improvements in the low-speed controllability of the baseline vessel could be made. Concepts involving thrust vector control and high-lift rudders were most effective.

A preliminary evaluation of the concepts considered on a cost-effectiveness basis indicated that some concepts for improved controllability deserve serious consideration for tankers which often operate in restricted water. Thrust vector control concepts and certain high-lift rudder concepts are most cost effective since they significantly improve controllability and have a relatively small impact on the ship design.

Additional efforts are required to develop a rigorous evaluation of the effects of improved controllability on the CRG casualty rate. Efforts are also required to further improve and confirm the performance and practicality of the concepts that have been identified as the most cost effective. This effort should be directed at a prototype installation for evaluation.

Acknowledgments

The authors would like to acknowledge the support of projects by MarAd's Office of Commercial Development and the U.S. Coast Guard upon which this paper is based. They would also like to acknowledge the support and comments of Mr. R. Falls of MarAd during the course of this work.

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APPENDIX C

SNAME Paper by Landsberg, Card, Eda, von Breitenfeld
and Kneirim on -

"Proposed Shipboard Maneuvering Data"

Published in the Proceedings of the Fifth STAR
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THE SOCIETY OF NAVAL ARCHITECTS AND MARINE ENGINEERS
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June 4-6, 1980

Proposed Shipboard Maneuvering Data

No. 16

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ABSTRACT

This paper proposes standardized shipboard formats for presenting information on a ship's maneuvering capabilities. The information is intended for practical use by the ship's officers and pilots in handling their vessel. Three standardized formats are presented: 1) Pilot Information Card, 2) Posted Bridge Diagram, and 3) Shipboard Maneuvering Booklet Outline. SNAME T&R Panel H-10 (Controllability) has developed these concepts with the assistance of a broad segment of the marine industry. This paper is intended to provide the opportunity for extensive review by all interested parties in order to promote widespread consensus so that future national and international regulations will be useful and consistant.

INTRODUCTION

> "...RECOMMENDS to Governments that they ensure that the master and officers have readily available on the bridge all necessary data concerning the maneuvering capabilities of the ship and stopping distances under various conditions of draught and speed"[1]

This paper addresses the concepts for providing information on a ship's maneuvering capabilities as developed by SNAME T&R Panel H-10 (Controllability).[2] The information included for practical use by the officers and pilots in handling the vessel. While the concepts presented here have already been exposed to a broad segment of the marine industry and have received favorable reaction, the Panel has developed this paper to provide the opportunity for all interested parties to review the concepts. A widespread consensus on these standardized formats is desirable so that future national and international regulations will be useful and consistant.

The International Maritime Consultative Organization (IMCO) adopted Resolution A. 160 on 27 November 1968, in response to international concern for the increased risk of collision because of the trend toward larger and faster ships. The increase in ship traffic and potential for collisions with subsequent spillage of oil and dangerous chemicals provide strong incentives to minimize the possibility of accidents. The collision accident involving the 37,100 DWT SS EDGAR M. QUEENY and the 54,100 DWT S/T CORINTHOS appears to be a classic example of maneuvering error (Fig. 1). The collision of these relatively small oil

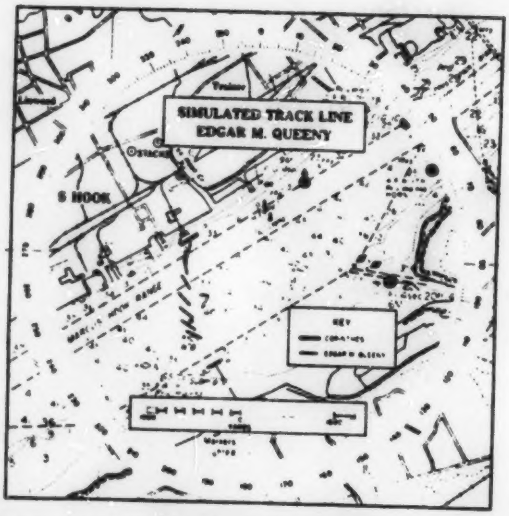

Fig. 1 S/T CORINTHOS/SS EDGAR M. QUEENY collision (2).

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[1] Resolution A. 160 of the International Maritime Consultative Organization (IMCO) (1).

[2] The opinions expressed in this paper are those of the authors and do not necessarily reflect those of their employers.

tankers resulted in 26 persons killed, 11 persons injured, complete destruction of the CORINTHOS, oil pollution of the Delaware River and a total of $20 million in property damage. A better understanding of maneuvering capabilities and more pilot-master communication could have eliminated this tragedy.

A later IMCO recommendation Resolution A. 209 specified that a maneuvering booklet be supplied to all ships and detailed the data to be presented. The United States Coast Guard implemented these ideas in 1975, requiring maneuvering information to be mounted on a bulkhead on the bridge of all ships entering U.S. waters. This attempt to provide the master and pilot with useful maneuvering information was met with industry concern over the utility of the information.

Another event emphasizing the need for such information was the International Convention on Standards of Training, Certification, and Watchkeeping for Seafarers held in 1978. Knowledge of shiphandling techniques was among the required skills where training and competence were specified.

SNAME Panel H-10 (Controllability) is concerned with the whole of vessel controllability from ship design to underway navigation. While there has been much analysis of ship capabilities, little emphasis has been put on development of this analysis and trial information for practical use by the master. The Panel decided to examine the types of maneuvering information that would be most useful, and to determine the best methods for obtaining and presenting it.

The Panel began the project in 1976 by requesting comments on the needs for information from 135 organizations in the marine industry. Of the one third that responded, nearly all strongly endorsed the need for such information and sent comments and suggestions. The Panel analyzed the responses and drafted proposed informational formats to accomplish the indicated needs. These proposals were then sent back to those who had responded to the first request. The information formats presented in this paper are the consolidation of those comments.

The emphasis during development has been to step back and determine what data really should be presented and in what form it should be. The formats generated were not limited to just meeting current regulations and in some cases they don't even comply. Basic assumptions are that the concepts and presentations should be:

1. Useful
2. Standardized
3. Lasting (But adaptable to technological changes)
4. Simple
5. Inexpensive
6. Complete

NEEDS FOR MANEUVERING INFORMATION ABOARD SHIP

> "The art of ship handling involves the effective use of forces under control to overcome the effect of forces not under control."[3]

The principal objective for providing shipboard information on the maneuvering capabilities of a ship is to reduce maneuvering errors and thus increase operational ship safety through preplanning.

Ship's officers and pilots have traditionally acquired shiphandling skills on-the-job under the tuteledge of experienced shiphandlers. While learning the skill took time, the apprentice had plenty of opportunity for experience as most ships possessed similar handling characteristics. In the 1960's the situation changed dramatically as ships of increasing size and speed were built. Ship forms and their general characteristics have also undergone radical changes within the last two decades to the point where maneuvering capabilities are quite different from one vessel to the next.

Specific objectives of maneuvering information should depend directly on personnel needs and abilities to use the data supplied. The following questions must be considered:

1. Who needs the maneuvering information and what benefits can be expected in terms of increased safety or effectiveness of vessel operations?

2. What information is needed by the pilot, the master and deck officers?

3. What are the different users' information priorities?

4. How can information be used in the process of ship handling?

5. What is the best way to make this information available to different users, and what must be available for "quick reference"? Where will the information be needed, i.e., in the person's pocket, posted at some convenient spot, lying on the table close at hand, in a cabin for study, in the chartroom bookcase, etc.?

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[3] Quote from the SOGREAH ship handling facilities near Grenoble, France.

6. What information is "vital" and what is only "interesting"?

7. How can the information be developed? (Tests, calculations, etc.)

8. What degree of accuracy is required?

9. What cost is reasonable per ship class?

Shipboard maneuvering information is primarily for use by the conning officer. It should help him in guiding the ship in the following general situations:

1. Open Seas - Sailing at ordered speed in moderate weather or at reduced speed in extreme weather.

2. Port Approach/Departure - Proceeding through straits, entrance channels and interior channels at appropriate speeds, and being prepared to choose the best emergency maneuver if needed.

3. Berthing and Anchoring - Making the final slow-speed maneuvers when maneuvering at moorings or anchorage, often with the aid of tugboats and thrusters.

4. Systems Failure - Maneuvering during any of the above situations with certain machinery systems failures.

Ship handling, however, is truly an art where the "feel of the wheel" or feeling of oneness with the ship is all important. Measurement of the forces under one's control is nearly as difficult as those not under control. Often this control must be within the confines of channels, rocks, reefs, and shoals, which constitute an ever present danger and require expertise in the art of ship handling, backed by an intimate knowledge of the pilotage area and the peculiarities of the particular vessel.

Table 1 classifies ship maneuvering forces into three categories according to the potential for their effective control by the conning officer. The following paragraphs describe these forces and information about them that would be useful.

Forces Directly Controllable

Certain forces are available to the conning officer to influence the movement of a vessel. During the 1979 New York Harbor Tug Boat Strike, for instance, one of the authors had occasion to turn a 509' Spanish motor ship with a bulbous bow in Port Newark Channel where it is 685' wide. The vessel's dead slow ahead was 7½-8 knots, and by the beginning of the turn she had only about 6 or 7 engine starts left. Two anchors, each with a shot well in the water weren't enough to hold the ship's forward surge. The several remaining engine starts (stop and go) on dead slow ahead were used to turn the vessel, the anchors providing the braking forces. By the time the vessel had a 30° angle to the pier the engine was down to one start. It was then only used after the compressor had built up pressure for two starts. The final landing and positioning was done with lines.

Table 1
Forces Affecting Vessel Trajectory

Forces Directly Controllable

- Propulsion
- Steering
- Ground Tackle
- Lines

Forces Under Indirect Control

- Inertia & Momentum
- Shallow Water Effects
- Cushion & Suction from Banks

Forces Not Under Control

- Environmental Forces of Wind, Waves, Current, etc.

In another situation one of the authors piloted a Russian tanker 680' long with a draft of 36' from the Bay Ridge Achorage to Stapleton Anchorage in New York Harbor on the ebb tide during the spring freshets. The ship had fetched up for about 15 to 20 minutes (amount of chain is not remembered but was probably 6 shots). It had no barges alongside and the pilot was about to disembark when the ship began to drag down between the Staten Island shore and other ships. It was at least a mile before the anchor again fetched up and we were able to heave anchor and return to our original anchorage. The author is probably well remembered for his opinions about the matching of Russian vessels to their anchors.

The point of these sea stories is that a lot of ship particulars must be precisely known by the conning officer. The following are comments on forces that are under the direct control of the conning officer:

Propulsion. a) Engine Type; Steam reciprocating, diesel, steam turbine, gas turbine, turbo or diesel electric, nuclear, etc., with their various limitations, i.e., diesel limited by compressor capacity stated possibly in the number of engine starts; excessive power at dead slow ahead or astern; steam turbine limited by the duration of the maximum number of turns astern, number of boilers and in close quarters enchanced if the engine can go from the ahead to the astern mode and back without signaling stop on the engine order telegraph, gas turbines by blow outs, etc.

b) Shaft Horsepower;

c) Shafting and Rudder Configuration; these characteristics are important for the mariner: Twin screw inboard or outboard turning, in conjunction with the distance between the screws affects the vessel's twisting abilities as well as affecting the propeller wash on a single rudder arrangement; Single screw right or left hand turning indicates tendencies for backing to port or starboard respectively; Reversible pitch propeller is unable to steer when making way through the water if the propeller is at 0° pitch.

Steering (Change of Heading). The effectiveness of the rudder can be demonstrated by turning circle diagrams, Z maneuvers, and spiral turns from deep water tests. A vessel's demonstrated ability to perform these maneuvers in conjunction with its size and draft can often indicate a good or poor handling vessel, as does one that can steer and be controlled at slow speeds or with the engine stopped. In this regard, it is important to know if a twin screw vessel has a single or twin rudder configuration. A thruster's horsepower is important information, and should an extended overload endanger its usefulness, the mariner should be so advised.

Ground Tackle. This subject is not often included in nautical studies. Many times anchors fail to hold a tanker being lightered into barges. Anchors are also most important in emergencies, and when docking unassisted by external forces (tugs). Presumably the anchor chain of the AMOCO CADIZ broke while she was being towed thus contributing to that disaster. Because a failure or inadequate design can leave the mariner in a lurch, the vessel's ground tackle limitations must be recognized and data developed.

Lines. Ships' officers know the numbers, types, and lengths of lines. A line breaking under tension is a real danger to personnel. Fortunately, tests have been made and strength data of lines is available. Allowance for aging and damage to lines must also be made.

Forces Under Indirect Control

As the ship moves through the water there are known effects that, while not under direct control, can and must be anticipated:

Inertia and Momentum. A graph should be devised to alert the mariner to the vessel's kinetic energy in foot pounds, or metric equivalent, at various speeds, and to further show how quickly it can be reduced through friction alone or by different maneuvers.

Curves to indicate the force necessary to overcome the effects of wind, current and swell when ahead or abeam are needed. They can be estimated from model tests and mathematical models. Methods to reduce a ship's momentum should be addressed comparing crash stops, turning circles, and rudder cycling from deep water tests of the individual ship.

Shallow Water Effect. This phenomenon reduces a ship's speed and rpm, causes squat, changes trim, and reduces steering ability. Full scale shallow water tests of some ship types has helped validate the use of model tests to predict steering and turning ability. Extensive model tests have been performed to study squat and trim effects, but full scale correlation has been difficult to achieve because of measurement problems. These phenomena seem to be affected by the vessel's mean draft. Also, vessels with unusual trim at high speeds have been known to hit bottom sustaining hull damage. (See Reference 3) Presently, squat is left to the mariner to resolve. A ship must carefully reduce speed when passing over shoals, when developing large ship waves upon entering shallow water, or when losing steering ability. Hopefully, better information about squat will be developed. Until then, available information should be presented.

Bank Effect and Vessel Interactions in Restricted Water. The phenomena of bank cushion and suction can be helpful when approaching a turn in a channel. Upon meeting another vessel in a narrow channel, however, cushion, suction and interactions from banks and other ships can be very difficult to handle. When overtaking in a channel, these interactions can have disastrous effects!

Forces Not Under Control

Forces of the environment such as wind, waves, currents, etc., are beyond the control of the conning officer. However, when encountered their effects on the ship need to be known.

Wind will affect the entire freeboard of the vessel. However, the inequality of resistance because of the distribution of the exposed wind area, i.e., location of the ship's house or trimmed condition, will often cause a turning moment. This is because of the static wind forces and the dynamic lift effect of the surfaces acting as sails. Under certain circumstances this turning moment may be reduced by shifting ballast. Required rudder angles are thus reduced yielding more rudder available in an emergency and less resistance to forward motion. The speed necessary to maintain the course is also reduced allowing additional safety margins. Although not critical, a table indicating the optimum forward draft for each after draft of a vessel as derived from model testing or mathematical models would be welcome.

A large amount of information is thus useful and needed but is, of course, difficult to quantify and display effectively. The Appendix to this paper provides a brief historical review of maneuvering data presentations that have been utilized. It also looks to future possibilities and trends toward onboard electronic maneuvering prediction devices.

PROPOSED FORMATS FOR MANEUVERING INFORMATION

> "...we can build the safest vessels...but, if the people that operate the vessels don't know what they're doing, or what the equipment is for or can't use it, or are sloppy on the job, you've got problems!"[4]

This section presents the proposed standardized maneuvering information formats developed by Panel H-10. These formats are based on the many responses from industry and numerous panel member deliberations that took place since 1976.

Nearly everyone involved, endorsed the need for such information, but consensus on what and how it should be presented was difficult to achieve. The variety of presentations currently being used to meet U.S. Coast Guard regulations was extensive and the need for standardization obvious. Many responses provided substantive contributions. Reference 4 for instance, was forwarded and analyzes the utility of ship trials and proposes a maneuvering data booklet. A historical review of maneuvering data presentations including future possibilities is presented in the Appendix to this paper.

There is obviously an important compromise to be reached between providing enough useful information in such a way so that sifting the pertinent data from the interesting is not too big a job to be worthwhile. Therefore, only items important to shiphandling should be considered. Also, future use of onboard computer aids, maneuvering predictors and other devices should prove effective in providing the needed information in useful forms.

The Panel concluded that the concept of three standardized formats is the best way to provide useful information. The formats are as follows:

1. Pilot Information Card (Fig. 2) - A small pocket card (3½" x 5½") that would contain ship's maneuvering information of prime importance to the pilot. It provides a minimum of needed information noting unusual vessel particulars. It would be filled out with any additional pertinent data and given to each pilot as he boards.

2. Posted Bridge Diagram (Fig.3&4)- A compact diagram in two parts(Each 11"x 14") mounted in a conspicuous and convenient place on the bridge. It would contain principal maneuvering information of a permanent nature for ready reference by both pilots and shipboard personnel.

3. Shipboard Maneuvering Booklet - A detailed manual containing information and instruction on the ship's maneuvering capabilities. Although it would be kept available on the bridge ready for quick reference, it is intended primarily for longer term study. The standardized section outline as shown in Figure 5 and use of a looseleaf binder would provide a convenient easily referenced catalogue of useful maneuvering information. A section for added notes by the master on the vessel's capabilities would also be helpful. Form fill-ins could be provided for pertinent information such as best headings for a Williamson turn. Such standardization will also make the booklet useful to pilots for augmenting the brief, readily available information provided on the pilot card and bridge diagram.

The standardized design of the pilot information card and posted bridge diagram were drawn from some presentations currently in use. The general design of the bridge format was taken from a standardized diagram (Fig. 12 in the Appendix), developed by the Oil Companies International Marine Forum (OCIMF). The OCIMF form satisfied both the IMCO resolution and present U.S. Coast Guard regulations. Looking to the future, Panel H-10's proposed format goes beyond present requirements in some areas, while omitting some specifics in other areas (for this reason the proposed diagram cannot be used to satisfy the present Coast Guard requirements).

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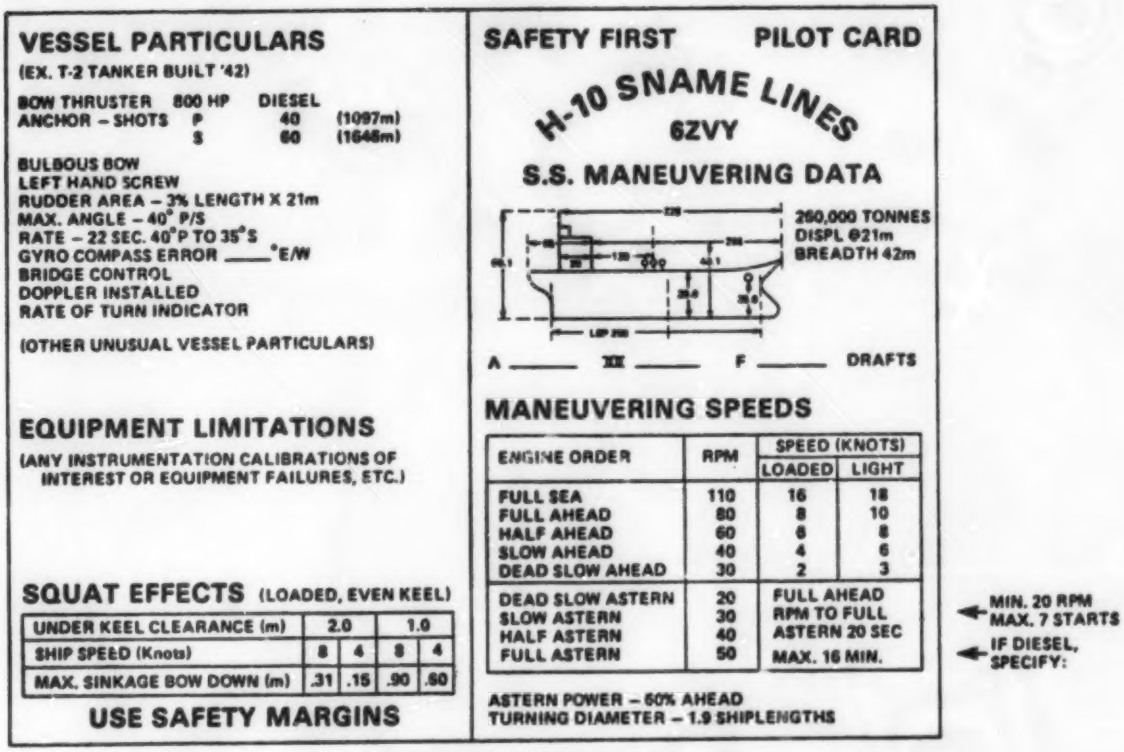
[4] RAdm. William M. Benkert at the Maritime Industry Symposium "Collision Avoidance Through Modern Electric Technology and Vessel Maneuvering Characteristics" (5).



VESSEL PARTICULARS

(EX. T-2 TANKER BUILT '42)

BOW THRUSTER 800 HP DIESEL
ANCHOR – SHOTS P 40 (1097m)
S 60 (1646m)

BULBOUS BOW
LEFT HAND SCREW
RUDDER AREA – 3% LENGTH X 21m
MAX. ANGLE – 40° P/S
RATE – 22 SEC. 40°P TO 35°S
GYRO COMPASS ERROR ____°E/W
BRIDGE CONTROL
DOPPLER INSTALLED
RATE OF TURN INDICATOR

(OTHER UNUSUAL VESSEL PARTICULARS)

EQUIPMENT LIMITATIONS

(ANY INSTRUMENTATION CALIBRATIONS OF INTEREST OR EQUIPMENT FAILURES, ETC.)

SQUAT EFFECTS (LOADED, EVEN KEEL)

UNDER KEEL CLEARANCE (m)	2.0		1.0	
SHIP SPEED (Knots)	8	4	8	4
MAX. SINKAGE BOW DOWN (m)	.31	.15	.90	.60

USE SAFETY MARGINS

SAFETY FIRST PILOT CARD

H-10 SNAME LINES

6ZVY

S.S. MANEUVERING DATA

260,000 TONNES
DISPL @21m
BREADTH 42m

A ____ XX ____ F ____ DRAFTS

MANEUVERING SPEEDS

ENGINE ORDER	RPM	SPEED (KNOTS) LOADED	SPEED (KNOTS) LIGHT
FULL SEA	110	16	18
FULL AHEAD	80	8	10
HALF AHEAD	60	6	8
SLOW AHEAD	40	4	6
DEAD SLOW AHEAD	30	2	3
DEAD SLOW ASTERN	20	FULL AHEAD RPM TO FULL ASTERN 20 SEC	
SLOW ASTERN	30		
HALF ASTERN	40		
FULL ASTERN	50	MAX. 16 MIN.	

← MIN. 20 RPM MAX. 7 STARTS

← IF DIESEL, SPECIFY:

ASTERN POWER – 60% AHEAD
TURNING DIAMETER – 1.9 SHIPLENGTHS

Fig.2 Pilot Information Card

The principal differences between the Panel H-10 proposal for the "bridge maneuvering diagram" and the present U.S. Coast Guard (USCG) requirements are given below:

1. The USCG presently requires turning circles to both port and starboard. Panel H-10's proposal shows only a turning circle to starboard, with a note stating that there is no appreciable difference between port and starboard circle under the specified calm weather, no current conditions.

2. While USCG regulations do not require turning circle data for any shallow water condition, Panel H-10 recognized that, in general, turning in shallow water results in substantially increased turning circle dimensions. Approximated shallow water ship response should provide an important basis for comparison of deep to shallow water capabilities and among different vessels. Panel H-10 proposes a standard 20 percent of draft under-keel clearance for the shallow water data because with this clearance the turning circle diameters on some vessels have been known to increase almost two fold. In full scale trials this is about as close as a company will commit its vessel in tests.

3. While USCG requires time and distance of advance and transfer required to alter the course 90 degrees, with maximum rudder angle (and constant power settings), Panel H-10 has proposed that "swept path" dimensions showing maximum advance and maximum diameter in a turning circle be given; these being operationally more significant.

4. In addition, Panel H-10 proposes turning circle data be for a standard 35 degrees rudder, for direct comparison among different ship's inherent characteristics. If the vessel is equipped with greater rudder angle capability, these turning characteristics would be additionally superimposed on the graph.

Although the turning circle diagrams are not intended to be drawn to scale, the shallow water diagrams are shown significantly larger to indicate their greater magnitude.

Metric conventions have been adopted with English equivalents provided on the posted bridge diagram. Dual unit presentations on the pilot card were considered, but rejected because of excessive clutter. The pilot also has the opportunity to write his own equivalents directly on the card when desired.

The use of colors in printing the standardized presentations is thought helpful in making them easy to use.

MANEUVERING CHARACTERISTICS S.S. MANEUVERING DATA

LENGTH BP	390.00 METERS (1,279.5 FEET)
LENGTH OA	400.00 METERS (1,312.3 FEET)
BEAM	71.00 METERS (232.9 FEET)
DEPTH	31.20 METERS (102.4 FEET)
SUMMER Fb DRAFT	25.25 METERS (82.8 FEET)
DISPLACEMENT	570,000 TONNES (561,000 LT)
DEADWEIGHT	516,895 TONNES (508,730 LT)
GRT	300,000 TONS

THRUSTERS	HP	TURNING RATE AT ZERO SPEED	MAX. SPEED USEFUL
BOW	800	5°/MIN.	4 KTS
STERN	500	2°/MIN.	6 KTS
COMBINED		8°/MIN.	7 KTS

MAXIMUM RUDDER ANGLE	STARBOARD RIGHT	PORT LEFT
	40 DEGREES	40 DEGREES

TIME AND DISTANCE TO CRASH STOP

ENGINE ORDER	FULL LOAD		BALLAST	
	TIME (MINUTES)	DISTANCE (MILES)	TIME (MINUTES)	DISTANCE (MILES)
FULL SEA SPEED	28.7	3.21	15.1	1.87
FULL AHEAD	22.4	1.85	12.2	1.14
HALF AHEAD	19.2	1.33	10.6	0.84
SLOW AHEAD	13.6	0.65	7.7	0.42

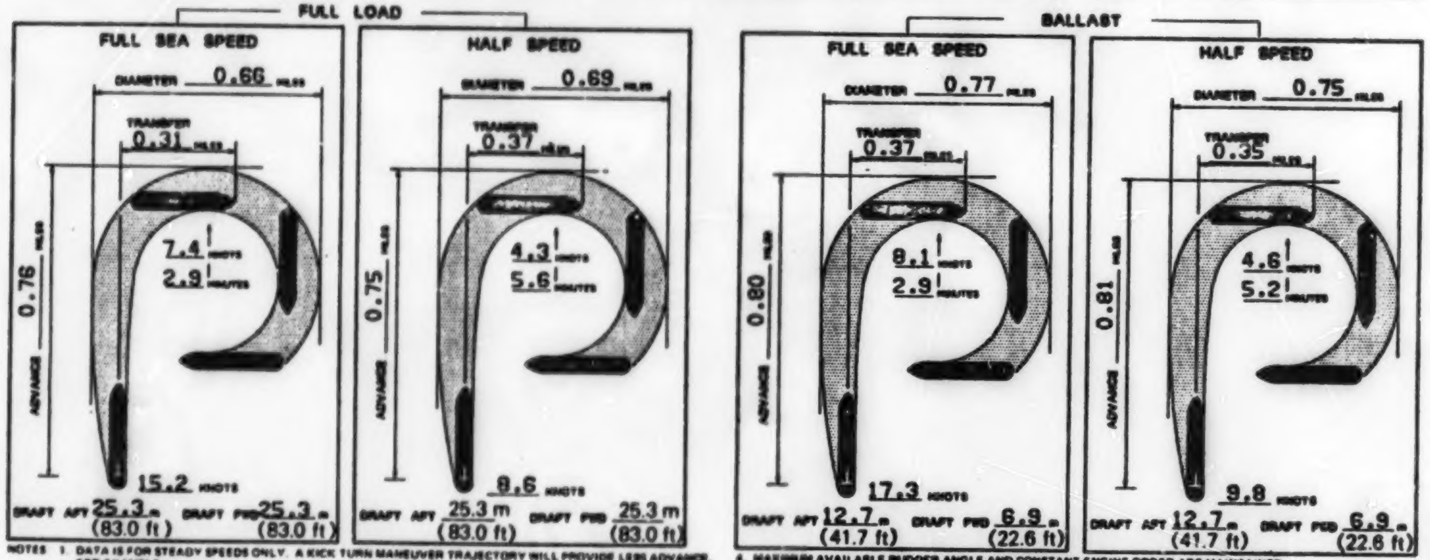
WARNING: THE RESPONSE OF THE SHIP MAY BE DIFFERENT FROM THAT LISTED IF ANY OF THE FOLLOWING CONDITIONS, UPON WHICH THE MANEUVERING INFORMATION IS BASED, ARE VARIED:

1. CALM WEATHER- WINDS 10 KNOTS OR LESS, CALM SEA
2. NO CURRENT
3. WATER DEPTH THREE TIMES THE SHIP'S DRAFT OR GREATER
4. CLEAN HULL
5. INTERMEDIATE DRAFTS OR UNUSUAL TRIM

ENGINE ORDER/R.P.M./SPEED

ENGINE ORDER	R.P.M.	SPEED (KNOTS)	
		FULL LOAD	BALLAST
FULL SEA SPEED	80	15.2	17.3
FULL AHEAD	55	10.5	12.0
HALF AHEAD	45	8.6	9.8
SLOW AHEAD	30	5.7	6.5
DEAD SLOW AHEAD	20	3.8	4.3
DEAD SLOW ASTERN	20	MAX. 16 MIN. TIME FULL AHEAD RPM TO FULL ASTERN 20 SEC.	
SLOW ASTERN	30		
HALF ASTERN	45		
FULL ASTERN	56		

DEEP WATER TURNING CIRCLE DIAGRAMS


FULL LOAD
FULL SEA SPEED
DIAMETER 0.66 MILES
TRANSFER 0.31 MILES
ADVANCE 0.76 MILES
7.4 KNOTS
2.9 MINUTES
15.2 KNOTS
DRAFT AFT 25.3 m (83.0 ft)
DRAFT FWD 25.3 m (83.0 ft)
HALF SPEED
DIAMETER 0.69 MILES
TRANSFER 0.37 MILES
ADVANCE 0.75 MILES
4.3 KNOTS
5.6 MINUTES
8.6 KNOTS
DRAFT AFT 25.3 m (83.0 ft)
DRAFT FWD 25.3 m (83.0 ft)
BALLAST
FULL SEA SPEED
DIAMETER 0.77 MILES
TRANSFER 0.37 MILES
ADVANCE 0.80 MILES
8.1 KNOTS
2.9 MINUTES
17.3 KNOTS
DRAFT AFT 12.7 m (41.7 ft)
DRAFT FWD 6.9 m (22.6 ft)
HALF SPEED
DIAMETER 0.75 MILES
TRANSFER 0.35 MILES
ADVANCE 0.81 MILES
4.6 KNOTS
5.2 MINUTES
9.8 KNOTS
DRAFT AFT 12.7 m (41.7 ft)
DRAFT FWD 6.9 m (22.6 ft)

NOTES

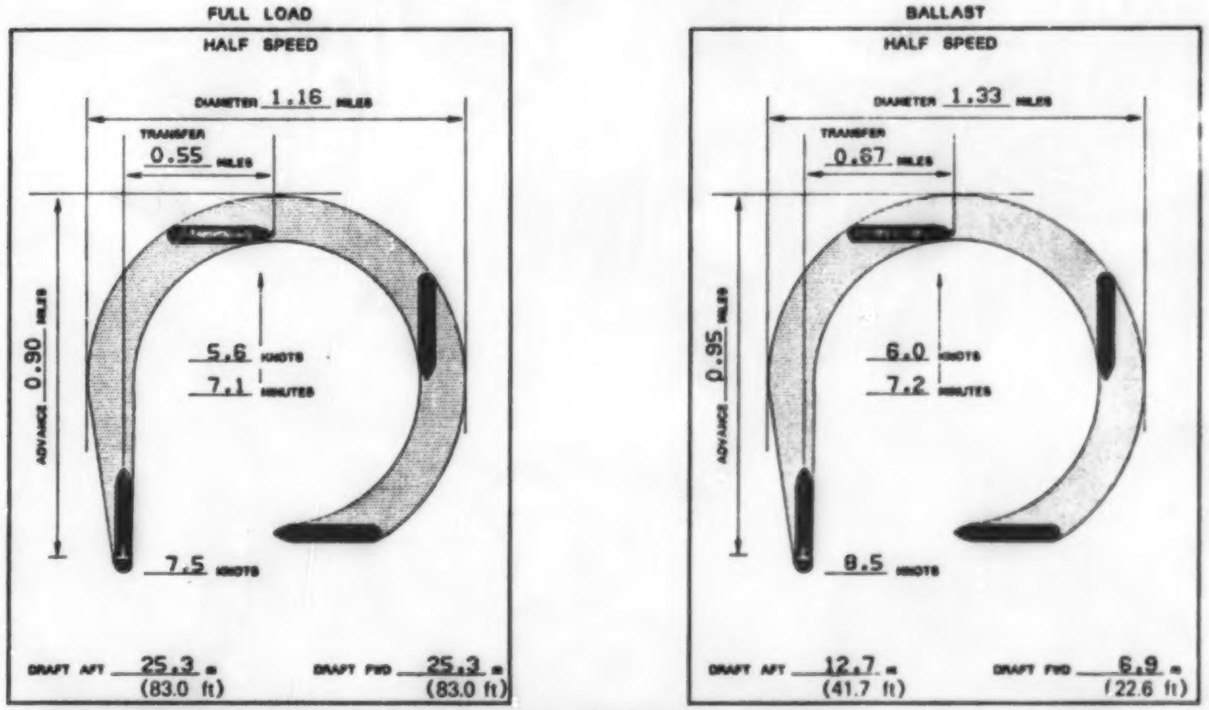
1. DATA IS FOR STEADY SPEEDS ONLY. A KICK TURN MANEUVER TRAJECTORY WILL PROVIDE LESS ADVANCE, FOR EXAMPLE
2. THERE IS NO APPRECIABLE DIFFERENCE IN THE TIME OR DISTANCE OF ADVANCE AND TRANSFER WHEN MAKING A TURN TO PORT OR STARBOARD. THEREFORE, ALL DIAGRAMS SHOW A STARBOARD TURN. SYMMETRICAL INFORMATION WOULD APPLY WHEN TURNING TO PORT.
3. ADVANCE, TRANSFER, AND DIAMETER ARE ABOUT THE SAME, REGARDLESS OF INITIAL SPEED. AT INITIAL SPEEDS SLOWER THAN HALF AHEAD, THE SPEED AT ANY POINT IN THE MANEUVER WILL BE LESS THAN SHOWN ON THE HALF SPEED DIAGRAM, AND TIMES TO MANEUVER WILL BE GREATER THAN SHOWN.
4. MAXIMUM AVAILABLE RUDDER ANGLE AND CONSTANT ENGINE ORDER ARE MAINTAINED.
5. ADVANCE IS MEASURED FROM A REFERENCE POINT AT THE HELMSMAN'S POSITION TO THE POINT OF MAXIMUM FORWARD MOTION.
6. IN ACTUAL OPERATION THE SHIP DOES NOT STOP ALONG A STRAIGHT PATH. THEREFORE, HEAD REACH WILL ACTUALLY BE LESS THAN SHOWN BUT THERE MAY BE APPRECIABLE SIDE REACH.

Fig. 3 Bridge Mounted Maneuvering Characteristics Diagram

MANEUVERING CHARACTERISTICS S.S. MANEUVERING DATA

SHALLOW WATER TURNING CIRCLE DIAGRAMS

WITH BOTTOM CLEARANCE EQUAL TO 20% OF DRAFT


FULL LOAD
HALF SPEED
DIAMETER 1.16 MILES
TRANSFER 0.55 MILES
ADVANCE 0.90 MILES
5.6 KNOTS
7.1 MINUTES
7.5 KNOTS
DRAFT AFT 25.3 m (83.0 ft)
DRAFT FWD 25.3 m (83.0 ft)
BALLAST
HALF SPEED
DIAMETER 1.33 MILES
TRANSFER 0.67 MILES
ADVANCE 0.95 MILES
6.0 KNOTS
7.2 MINUTES
8.5 KNOTS
DRAFT AFT 12.7 m (41.7 ft)
DRAFT FWD 6.9 m (22.6 ft)

WARNING: THE MANEUVERING CHARACTERISTICS PRESENTED ON THIS FORM ARE BASED UPON THE CONDITIONS LISTED BELOW. ANY VARIATION OF THESE CONDITIONS MAY CAUSE THE RESPONSE OF THE SHIP TO DIFFER FROM THAT PRESENTED

1. CALM WEATHER- WIND 10 KNOTS OR LESS, CALM SEA
2. NO CURRENT
3. REGULAR BOTTOM, CLEAR OF BANKS
4. CLEAN HULL
5. DRAFTS AS SHOWN

THE ABOVE DATA IS APPLICABLE ONLY AT 20% BOTTOM CLEARANCE AND IS OFFERED ONLY AS AN EXAMPLE OF HOW MANEUVERING INFORMATION WILL CHANGE IN SHALLOW WATER.

NOTES:

1. THERE IS NO APPRECIABLE DIFFERENCE IN THE TIME OR DISTANCE OF ADVANCE AND TRANSFER WHEN MAKING A TURN TO PORT OR STARBOARD. THEREFORE, ALL DIAGRAMS SHOW A STARBOARD TURN. SYMMETRICAL INFORMATION WOULD APPLY WHEN TURNING TO PORT.
2. ADVANCE, TRANSFER, AND DIAMETER ARE ABOUT THE SAME, REGARDLESS OF INITIAL SPEED. AT INITIAL SPEEDS SLOWER THAN HALF AHEAD, THE SPEED AT ANY POINT IN THE MANEUVER WILL BE LESS THAN THAT SHOWN AND TIMES TO MANEUVER WILL BE GREATER THAN SHOWN. THE OPPOSITE IS TRUE AT INITIAL SPEEDS GREATER THAN HALF AHEAD.
3. MAXIMUM AVAILABLE RUDDER ANGLE AND CONSTANT ENGINE ORDER ARE MAINTAINED.
4. ADVANCE IS MEASURED FROM A REFERENCE POINT AT THE HELMSMAN'S POSITION TO THE POINT OF MAXIMUM FORWARD MOTION.
5. THE STOPPING DATA APPEARING ON THE DEEP WATER MANEUVERING DIAGRAM ARE NOT SIGNIFICANTLY DIFFERENT IN SHALLOW WATER.
6. THE STEADY SPEED DATA APPEARING ON THE DEEP WATER MANEUVERING DIAGRAM ARE REDUCED BY ABOUT 10% IN SHALLOW WATER.

Fig. 4 Bridge Mounted Maneuvering Characteristics Diagram-Shallow Water Turning

Fig. 5 Shipboard Maneuvering Booklet Outline

I. INTRODUCTION

II. GENERAL DESCRIPTION - For identification including such items as ship name, type, call letters, nationality, class (if one of a number of vessels), date built, owners, past owners, past vessel names, etc.

III. DIMENSIONS, VISIBILITY, AND UNUSUAL FEATURES - Provides general and unusual characteristics of the ship and visibility diagrams.

   A. Dimensions - Length, breadth, depth, drafts, GRT, DWT, cubic, keel to top of mast or highest projection, mast position relative to ship's length, keel to bridge, bridge to bow, bridge to stern, etc.

   B. Visibility - Limitations when light or loaded, at different trims, etc.

   C. Unusual Features - Characteristics of bulbous bow, changes to vessel since original construction (increase in hull length, etc.), other items related to shape, size, and maneuvering capability.

IV. NAVIGATIONAL AND ELECTRONIC EQUIPMENT - For indicating type of equipment, location, spares required, storage of spares because of equipment bias or errors.

   A. Gyro Compass and Repeaters

   B. Magnetic Compass

   C. Radars, Collision Avoidance Systems and Transponder Systems

   D. Electronic Positioning Devices

   E. Fathometer

   F. Radius

V. PROPULSION SYSTEM AND STOPPING/STARTING IN DEEP WATER - Describes propulsion and stopping characteristics of the vessel in calm, deep water situations.

   A. Propulsion Plant Description - Manufacturer, date of construction, number of cylinders, number of boilers, etc., with known limitations.

   B. Propellers - Manufacturer, material composition, blade pitch, diameter, number of blades, direction of turn, etc.

   C. Stopping and Starting Characteristics -

      1. Crash Stop Data - Full and half speed stopping projections from light and loaded conditions compared with turning circle projections for the same conditions.

      2. Coasting Stop Data - Projections of speed reduction versus distance and time when propeller stopped from full speed in light and loaded conditions.

      3. Rudder Cycling Stop Data - Stopping projections and swept path when a program of rudder cycling is performed.

      4. Accelerating Data - Tables of time and distance to accelerate.

VI. STEERING SYSTEM AND TURNING IN DEEP WATER - Describes steering system and turning characteristics of the vessel in calm, deep water situations.

   A. Rudder and Steering Machinery - Rudder type, position and shape, area relative to underwater cross-section of the hull, rudder rate, steering machinery characteristics and operational alternatives.

   B. Turning Circles -

      1. Turning circle test data - Plotted for full and half speed in light and loaded conditions showing steady state circle, advance, and transfer, etc.

      2. Kick Turns - Projections from stopped and low speed conditions.

      3. Course Change Maneuvers - Projections at full and half speed telling when to start and stop a turn to achieve a described heading change.

   C. Zig Zag Maneuvers - Plotted data from zig zag trials showing overshoot and other parameter relationships.

D. Spiral Maneuvers - Data from spiral tests plotted to show hysteresis effect, etc.

E. Minimum Ship Speed - Minimum speed at which the vessel can be operated on a straight course with no wind or current. (Propulsion plant minimum speed limitations should be noted here.)

VII. SHALLOW AND RESTRICTED WATER MANEUVERING - Develops effects of shallow and restricted water on maneuvering characteristics with reference to calm, deep water descriptions in sections V and VI.

A. Speed and Power Loss - Concepts of speed loss and additionally available rudder forces described.

B. Bottom Clearance and Trim - Relationship (general and specific) of squat and trim with speed, water depth, and bottom type.

C. Stopping and Starting Characteristics - Effects on calm, deep water characteristics described, and projections presented.

D. Turning Characteristics - Effects on calm, deep water characteristics described, and projections presented.

VIII. MANEUVERING IN WIND, CURRENT, AND WAVES - Develops effects of wind, current, and waves on maneuvering characteristics.

A. Minimum Steering Speed in Wind- Minimum speed at which the vessel can be steered on a straight course as a function of wind speed and direction.

B. Speed and Power Loss - Effects from different directions and projections provided.

C. Bottom Clearance and Trim - Wave/swell effects on bottom clearance projected for guidance.

D. Stopping and Steering Characteristics - Effects and magnitude of wind, current, and waves projected.

E. Turning Characteristics - Table of effect of wind and current on turning with rudder angles necessary.

F. Backing Characteristics

IX. TUGS, THRUSTERS, GROUND TACKLE & OTHER AUXILIARY MANEUVERING DEVICES

A. Tug Usage - Tugs needed under different situations, positions to avoid hull damage, acceleration and turning moments expected, thrust required to offset the effects of wind, current and swell, etc.

B. Thrusters - Manufacturer, date, type, horsepower, position(s), limitations, pivot point when thrusting from stopped in water, effect on forward or astern motion, etc. Maximum speed for operational effectiveness of the thrusters indicated.

C. Specifications of Equipment - Characteristics and limitations in different bottom conditions, water depth, wind, or current situations.

1. Ground Tackle
    a. Anchors
    b. Chain
    c. Windlass
2. Mooring Lines

X. EMERGENCY PROCEDURES - Procedures to follow or alternative actions to perform described for various identifiable emergency situations. (Many of these system failures should come from case records of past difficulties and disasters with the proposed recommendations tested as to their effect).

A. Williamson Turn - Procedure described and diagram provided.

B. Steering Machinery Failure -

1. Notification procedures
2. Alternate steering available
3. Use of tugs, propellers, and ground tackle
4. Proposals for repairs

C. Engine Failure

1. Notification procedures
2. Use of ground tackle, etc.
3. Proposals for repairs

D. Vessel Drift Patterns-Probable unpowered or unsteered ship drifting patterns.

E. Others

XI. MISCELLANEOUS

REFERENCES

APPENDICES -

A. Pilot Card

B. Bridge Maneuvering Diagram

USE OF MANEUVERING DATA

> "...And all I ask is a tall ship and a star to steer her by" - John Masefield.

This section shows how the shipboard maneuvering information can be used. The proposed data formats are reviewed for their usefulness, accessibility, and simplicity.

Data Users

The vessel's master and mates control vessel movement most often in the open sea and port approach scenarios while pilots conn during the port approach and berthing scenarios. The needs of these two groups are different.

The master and mates are often more familiar with the particular ship than the pilots. They are aboard for longer periods of time, with more time available to study manuals, etc. The pilot has more-immediate needs. He may be experienced in handling vessels in restricted water maneuvering situations, but not be familiar with each ship and its capabilities. He may come aboard and start immediately to work, perhaps at night. There is thus little time to locate booklets, to study them and extract the information desired, or to decipher complex diagrams posted in a remote corner of the bridge.

Ship's officers are generally less knowledgeable about the maneuvering situation. They are ultimately responsible, however, for the ship. They must pass pertinent information to the pilot and be aware of techniques and potential problems. The officers will also have occasion to perform maneuvering tasks when pilots are not available. They have long periods at sea where they can study more extensive documents regarding the ship's capabilities and the principles involved.

In addition to ship officers and pilots, shipowners, charterers and port regulatory officers can benefit from vessel maneuvering information. It can be used to determine if a certain ship can effectively operate in a particular trade and harbor/waterway situation. During the sale of a vessel this information would conceivably be of value to insurance underwriters in determining any inherent faults of a vessel. The need for definitive information for a vessel's inherent capabilities should also awake a concern by prospective builders to ensure specification of adequate control requirements in the design of new ships.

Pilot Information Card

The "Pilot Information Card" in Figure 2 contains only specific ship information that would be of immediate use to the pilot in quickly understanding the maneuvering capabilities of the ship in its light or loaded conditions.

The standardized format on both sides of the small card provides a hand holdable reference to the needed data during his work aboard and for later study and comparison to improve his skills. A few descriptive facts of the vessel's characteristics and its maneuvering abilities give the pilot most of what he immediately needs. Drafts are, of course critical. Displacement at full draft is an indication of vessel inertia. Propulsion plant type is also important since it determines available backing thrust, time to reverse thrust and number of engine starts. Maneuvering RPM's and their estimated speeds are also handy especially since they vary widely from vessel to vessel.

Unusual vessel particulars such as left hand screw, 40° rudder capability, etc., would be listed on the pilot card to alert the pilot to their presence. Reversible pitch or left handed propellers, for instance, demand piloting techniques different from those on the normal right hand turning wheel. A Kort nozzle may affect slow speed maneuvers. A bulbous bow must be considered when maneuvering in close waters because of possible damage to both vessel and dock.

Under some circumstances exact height or vertical clearance is important. Dimensions are needed so that the effects of trim and draft on clearance can be calculated. General dimensions also help the pilot accurately estimate distances.

Knowing the class of vessel, the year built, and any past names, gives the pilot a reference point to distinguish the vessel's characteristics. It may be a vessel or type that he has had prior experience on and could recall. Age might be an indicator of propulsion equipment dependability.

Noting temporary equipment defects and limits is particularly useful and helps the master fulfill his need of informing the pilot of any equipment problems that limit capabilities.

Reasonably accurate squat effect data of the vessel in shallow water could be critical information to the pilot. Currently pilots rely on "rule of thumb" formulas. The information to be provided would still be approximate, but would give a better relative guide to the squat of the particular vessel when compared with similar data from other ships with which he is experienced.

The full speed, deep water turning diameter in ship lengths gives the pilot a quick index to the turning capabilities of the vessel. The relationship of a vessel's length to its turning diameter provides an easily recognized "rule of thumb" on the vessel's maneuvering capabilities. For further detail he can refer to the posted bridge diagram.

Posted Bridge Diagram

The posted bridge diagram in Fig. 3 and 4 provides additional, but less immediate, information for the pilot. The standardized format allows the visiting pilot or new ship's officer to quickly understand the primary maneuvering capabilities, and compare them to characteristics of other ships. It also provides a document to constantly alert masters and mates to maneuvering capabilities of their vessel.

Ship particulars and engine order (RPM) speed information is used in a similar manner as described for the pilot card. Also available is maximum rudder angle.

Bow and stern thruster horsepower and ship turning rates in calm undisturbed conditions provide a relative measure of the thrusters' effectiveness. Time and distance for crash stops similarly provide relative guides to vessel stopping ability. These time and distance estimates can further provide useful tools for the mariner in performing efficient and safe port approach maneuvers.

Deep water turning circle diagrams indicate maneuvering space and provide, through the standardized format, a quick reference for planning against emergency situations. Comparing the turning circle with the crash stop gives the mariner an understanding of the relative distance required. The swept path presentation is used because it shows the greatest collision distance and this can vary considerably from traditional advance and tranfer definitions. Only right turn diagrams are shown because the differences between left and right turns on most ships is negligible.

A separate presentation of shallow water turning circle information provides the mariner with some appreciation of shallow water effects. The presentation of the swept path, although of standard size, is roughly in proportion to the dimensional differences to be expected in going from deep to shallow water. The 1.2 water depth to ship draft ratio was chosen as standard, primarily because of the ESSO OSAKA shallow water trials held in 1978 (See reference 6). This ratio was the minimum prudent under-keel clearance for testing. As more is known of the effects of shallow water, the mariner can be provided with information on behavior at different water-depth-to-draft ratios.

Shipboard Maneuvering Booklet

The "Shipboard Maneuvering Booklet" is more of a manual of maneuvering data on the particular ship. The booklet would permit operating personnel to study their ship's capabilities in depth over an extended time frame. The booklet would always be kept available on the bridge for study by watchstanders and cadets. Standardizing the outline should make the needed data easy to find and will also make the booklet useful to transient pilots. In the wheelhouse or chart room it will be available for immediate reference when on-the-spot information is required to augment the brief information provided on the pilot card and bridge diagram.

In addition to material found on the pilot card and the bridge posted diagrams, the manual would give a thorough description of the capabilities and limitations of the steering, propulsion, and ground tackle systems as well as methods to be used following a system failure. Possible accident scenarios could be posed with suggested options. This would promote advanced planning for emergency situations. For example, will a VLCC such as the AMOCO CADIZ back into a wind and sea on the port or starboard side, and how effective and what elements of danger might be contained in such a maneuver?

The booklet at this stage requires some further thought and much development. The outline proposed is intended to be all inclusive. Standards for material to be included will vary according to ship type and service. A standardized outline with looseleaf pages appears to be an attractive and practical approach to developing and providing booklets that will be useful.

MANEUVERING DATA ACQUISITION AND PRESENTATION COSTS

Costs of providing shipboard maneuvering data must be considered and balanced with the benefits to be achieved. Even with the current state of the art of analytical ship model testing and full scale trials analysis, it is not possible to provide information that will precisely say what trajectory will occur under all conditions. Indeed, ship handling margins will always be necessary since even a small current has a tremendous effect which overshadows even moderate prediction inaccuracies. It is possible to inexpensively provide a reasonably accurate "relative" measure of a vessel's inherent maneuvering capabilities. This section discusses how various data can be developed and the relative costs involved. Consistency of the data in showing relative capabilities between vessels is required, however, if the information is to be valuable.

Data Acquisition Techniques

Shipboard maneuvering data can be obtained through the following technical procedures:

1. Full-scale maneuvering trials,
2. Free-running model tests with suitable scale effect corrections,
3. Computer simulations utilizing captive model test results, and
4. Computer-aided estimates utilizing standardized series test results.

The following general descriptions of these techniques outline their characteristics:

Full-scale maneuvering trials. While actual maneuvering data can be obtained in ship trials, the accuracy of this data is frequently affected by sea conditions (e.g., wind and current) and instrumentation. Figure 6 shows an example of a turning trajectory obtained from recent full-scale trials of the ESSO OSAKA carried out in deep and shallow water. Although careful full-scale trials are highly desirable in acquiring accurate maneuvering data, they can be quite expensive and dependent on the availability of ship-time and instrumentation.

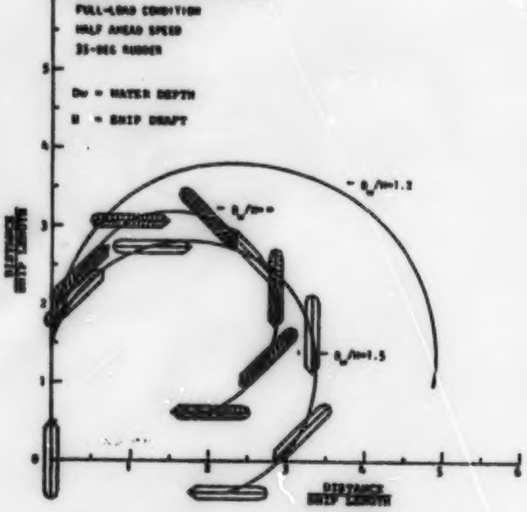


Fig. 6 Effect of Water Depth on Turning Performance (ESSO OSAKA trial results in deep and shallow water) (6)

Fig. 7 Rudder Area and Advance

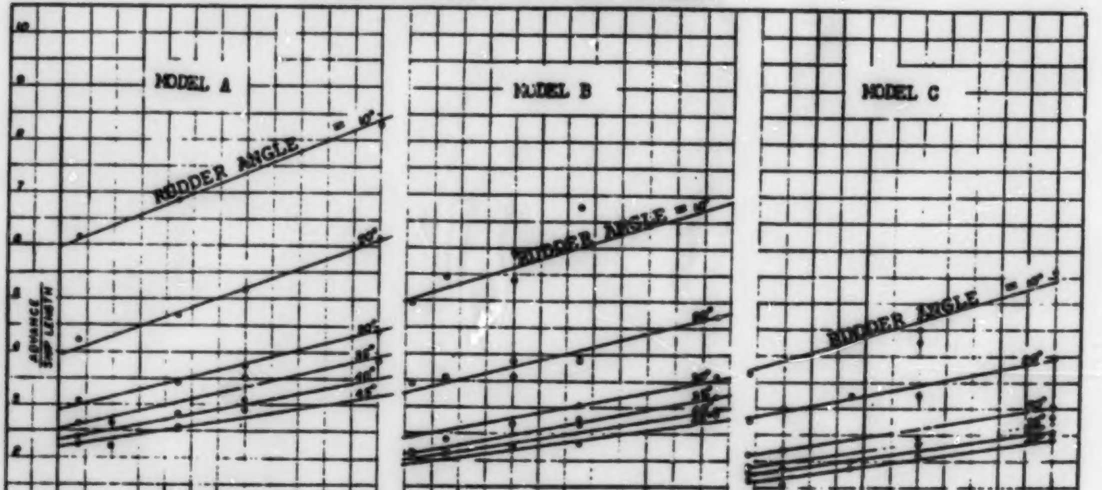
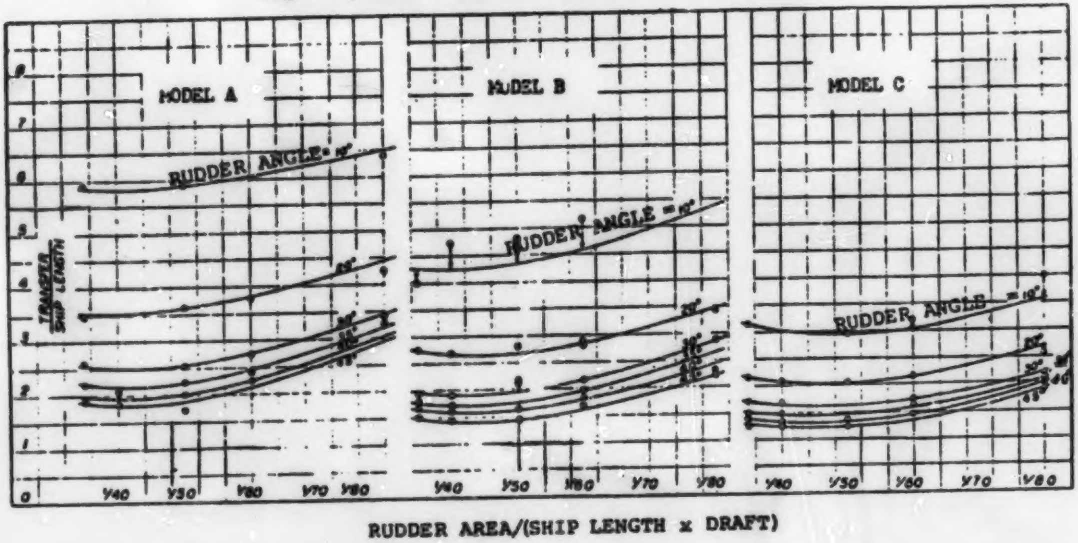


Fig. 8 Rudder Area and Transfer at Turning



Free-running models. Free-running self-propelled models have been used for years to assess the maneuvering characteristics of various ships. Figure 7 and 8 show examples of advance and transfer determined from a series of free-running model tests (7). Free-running tests are convenient and relatively inexpensive; however, they have certain limitations including scale effect. Since a greater-than-scaled thrust is required in free-running model tests, the rudder behind a propeller produces a greater-than-scaled force. If a rudder is not behind a propeller, the rudder generates smaller-than-scaled force due to the greater wake fraction for the scaled model.

Computer simulations based on captive model tests. During captive model tests, a ship model is restrained to a dynamometer on a "rotating arm" or a "planar-motion-mechanism" and is forced to follow a prescribed path (circular or sinusoidal). The hydrodynamic forces acting on the model are measured as functions of path curvature, drift angle rudder angle, and propeller RPM. Hydrodynamic data (in coefficient form) obtained from a series of captive model tests are included in a mathematical model, which represents the ship maneuvering characteristics by the use of yaw-sway-surge-rudder equations of motion (8). By exercising the mathematical model on a digital computer, ship maneuvering characteristics can be predicted.

Figure 9 shows an example of a turning trajectory obtained from a computer simulation run which was based on a series of rotating-arm test results (8). For comparison, the full-scale trial result is also shown.

Computer simulation runs can be made using estimated hydrodynamic coefficients on the basis of previous work on similar hull forms. For example, much hydrodynamic data has been measured on model tests of large tankers. This allows realistic estimates of the hydrodynamic coefficients to be made using a semi-empirical approach. This approach is probably the most promising and inexpensive procedure available for predicting maneuvering characteristics at this time.

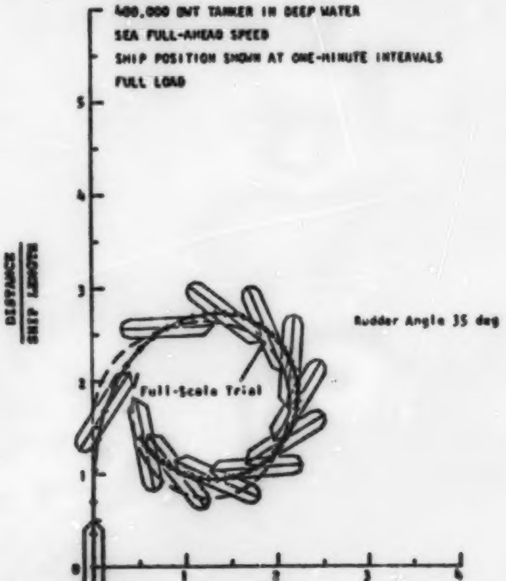


Fig. 9 Turning Trajectory Correlation between Model and Ship

Computer-aided predictions utilizing previous tests. Computer-aided estimates of maneuvering characteristics can be made using the results obtained in a standard series of model tests (e.g., data shown in Figures 10 and 11). Equations are determined through the least-square fit of these data points.

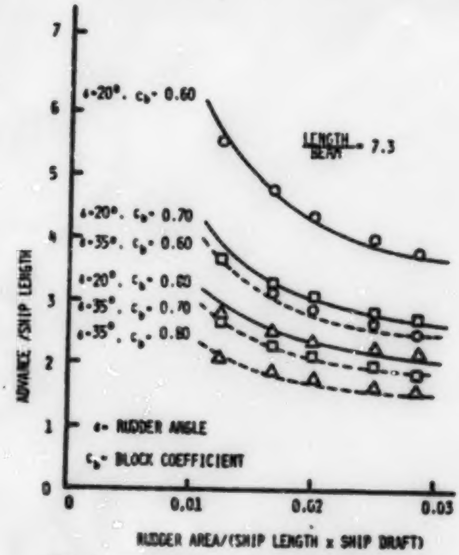


Fig. 10 Comparison Between Estimated and Model Test Predicted Advance

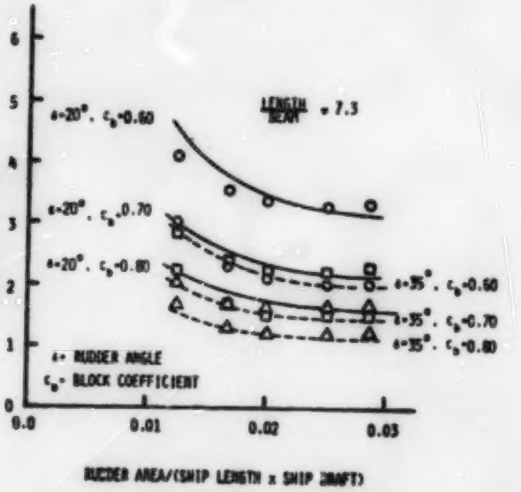


Fig. 11 Comparison Between Estimated and Model Test Predicted Transfer

Estimations of maneuvering characteristics can then be made by utilizing major hull parameters such as:

- Rudder angle and relative rudder size
- Block coefficient (C_b)
- Ship length-beam ratio.

Forms of these equations are determined on the basis of the following factors:

1. Theoretical consideration of the hydrodynamic forces acting on ships under various conditions and
2. Examination of test results of free-running models, captive models, and full-scale ships.

Finally, polynomial equations have been developed (7) to achieve realistic motion predictions using only a small number of parameters. Figures 10 and 11 show results of estimated advance and transfer, respectively using these empirical polynominals.

This approach may be effective to make minor modifications of existing maneuvering data to a new design.

Development of Maneuvering Information and Cost

Development of the maneuvering information for the proposed formats would usually be the result of combining a number of the techniques mentioned above. A series of full-scale trials will normally be available on the first of a ship class. In some instances ship maneuvering model tests will have been performed on the design, often resulting in a mathematical model for the prediction of ship maneuvers. Where such information is not available, computer-aided estimates using standardized series or similar ship test results could be used to develop the data presented in the pilot information card and the posted bridge diagram.

Tables 2 and 3 summarize the data to be prepared and its normal source for the posted bridge diagram and the pilot information card, respectively.

Data development costs will vary according to data sources and unusual characteristics of the ship involved. Normal analysis and preparation costs range from $400 to $1200 per ship for either the single posted bridge diagram or 1,000 copies of the pilot information card.

The Shipboard Maneuvering Booklet is proposed primarily as a standardized outline into which the operator would provide information in the amount and the level of detail considered useful. Costs are thus difficult to project. The booklet should, however, provide a convenient format to report available information on the ship and should not be considered an expensive item.

Table 2 Data development for posted bridge diagram

SHIP PARTICULARS - Available in ship construction specifications

TIME AND DISTANCE TO CRASH STOP - Measured from builder's trials or from full-scale trials during normal operation.

ENGINE ORDER/RPM/SPEED - Partially available from ship acceptance trials and developed from model test resistance data and machinery constraints.

THRUSTERS - Normally available from acceptance trials.

MAXIMUM AVAILABLE RUDDER ANGLE - Defined in steering gear specification.

DEEP AND SHALLOW WATER TURNING CIRCLE DIAGRAMS - Partially available from full-scale acceptance trials with adjustments for conditions based on similar vessel's demonstrated capabilities.

Table 3 Data development for pilot information card

VESSEL PARTICULARS - Available in ship construction specifications and on plans and equipment specifications

MANEUVERING SPEEDS - Same information as Engine Order/RPM/Speed on Posted Bridge Diagram

EQUIPMENT LIMITATIONS - This section to be written on by master for various temporary equipment problems

SQUAT EFFECTS - Developed using similar ship model tests and empirical data on squat effects.

CONCLUSIONS AND RECOMMENDATIONS

1. Information on a vessel's maneuvering capabilities is needed by masters, mates, and pilots to minimize the increasingly severe consequences of vessel accidents. Panel H-10 (Controllability) of SNAME has developed concepts for the standard presentation of this information. These concepts are described in this paper to develop a consensus on requirements and to set presentation format standards.

2. The major requirement is to develop standardized formats for data presentation from which pilots and mariners can quickly learn about a ship's maneuvering characteristics, and compare one ship to another. Existing presentations of maneuvering data are not all standard which makes quick reference difficult.

3. Absolute accuracy of the data is less important than its relative indication of how well the ship can be expected to maneuver compared to how well other vessels have performed. The effects of current, wind, and other factors are often very significant and overshadow the inaccuracies in maneuvering data prediction.

4. Standardized presentations of data should be both lasting and adaptable to technological improvements while remaining inexpensive to develop. Recent shallow water ship trials and model tests, for instance, provide the basis for relatively accurate estimation of shallow water behavior. Such predictions should be included for the use of the mariner.

5. Information to be presented must be carefully selected to ensure that the mariner is not overloaded with data. Three types of data formats are proposed to provide a balanced, easy transfer of information:

- o Pilot Information Card
- o Posted Bridge Diagram
- o Shipboard Maneuvering Booklet

6. Use of the data acquisition techniques proposed results in preparation costs of $400 to $1200 each for the single posted bridge diagram and the pilot information card. These costs are considered to be quite reasonable for the potential benefits to be derived.

7. The shipboard maneuvering booklet requires further analysis to determine needed standards. Its use as an outline for data presentation should provide a convenient format for reporting useful information. Standardization of this outline makes it simple for mariners to reference this data when information beyond the pilot information card and posted bridge diagram is desired.

ACKNOWLEDGMENTS

Sincere appreciation is extended to the many organizations and individuals who contributed during the development of the data formats. Concepts and ideas along with current maneuvering data presentations being used were submitted and extensive comments provided on the Panel's preliminary draft formats.

The proposed shipboard maneuvering data formats and the development of this paper are the result of the joint deliberations and efforts of the members of Panel H-10 (Controllability):

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APPENDIX - HISTORICAL REVIEW OF MANEUVERING DATA PRESENTATIONS

> "The NTSB[5] and the Coast Guard believe that the lack of maneuvering information in the pilothouse has been at least partially responsible for errors of judgement that have led to collisions. The need for maneuvering information is particularly critical for transient mates and pilots on supertankers. It is also needed by a pilot or mate on any class of vessel with which he is not familiar. The purpose of these regulations is to provide this information for use in the pilothouse to reduce errors in maneuvering" (9).

The danger and undersirability of spilling cargoes such as oil and chemicals have become more important with the relatively recent basic changes in ship types and public sensitivity toward preservation of the environment. Worldwide concern was heightened in 1967 when the TORREY CANYON stranded off the British Coast. Shipboard and land-based personnel safety from accident caused explosions are also of increased popular concern for both the newer LNG and LPG carriers. Ship controllability is one of the areas where attention has been focussed in order to reduce chances of pollution and increase safety.

IMCO Recommendations

In 1968 IMCO officially recognized the need for maneuvering and stopping information. A resolution was passed which recommended that governments "ensure that the master and officers have readily available on the bridge all necessary data concerning the maneuvering capabilities of the ship and stopping distance under various conditions of draught and speed" (1). In 1971 IMCO offered more specific recommendations aimed at "ensuring uniformity in the information to be included in the maneuvering booklets available on board, particularly in large ships carrying dangerous chemicals in bulk " (10). They also recommended that individual countries require on board maneuvering booklets, containing specified information, and that they be available to the masters of large ships. Reference 11 describes the IMCO recommendations in detail. The booklet's content is to consist of two parts:

Part 1 - Maneuvering data and/or diagrams including lowest constant engine rpm at which ship can steer, change of heading and turning circle diagrams, stopping distance from full speed with engines stopped and from full speed with applications of astern power at various levels. Copies of the appropriate diagrams should be posted on the bridge.

Part 2 - Supplementary information drawing the attention of masters to several points to be considered in relation to the safe handling of the ship: effects of squat, extent of "blind zone" forward created by the forward part of the vessel, effective increase in draught due to ship motion in a seaway, and a note that the quickest method of reducing headway is to turn under the influence of full rudder, with or without the use of engine astern power.

A number of countries have already adopted these recommendations. There has also been discussion within the IMCO Subcommittee on Safety of Navigation of the need to include these recommendations in SOLAS 1974 which would make them mandatory for new vessels.

U.S. Coast Guard Requirements

While the United States was pursuing a Resolution of maneuvering information at IMCO, activity was also taking place at home. In 1968 the U.S. National Transportation Safety Board conducted a "Study of Collisions of Radar-Equipped Merchant Ships and Preventative Recommendations " (12). In the study NTSB analyzed collisions involving U.S. vessels during the 5 year period 1963-1967 where radar was involved - 48 collisions involving 96 ships. Following completion of these analyses, NTSB sponsored a Marine Radar Seminar attended by representatives of industry (marine and electronics), CG, MarAd, FAA, MSTS. The purpose of the seminar was to obtain ideas which could be applied or developed for collision avoidance relative to radar-equipped vessels.

Recommendation D. 1 of the study is the first national initiative suggesting maneuvering information be posted in the pilothouse or bridge on a "fact sheet." The recommendation states:

> "The Safety Board also makes the following recommendations derived from the many worthwhile recommendations made at the seminar"
>
> "The Coast Guard consider amending the vessel inspection recommendations to require vessels to have stopping and turning capability data at different loading conditions posted on the bridge."

---

[5] National Transportation Safety Board

The IMCO resolutions, the NTSB study and U.S. Coast Guard assessments of vessel accidents led the Coast Guard to publish a notice of proposed rulemaking in August 1972 which proposed that the operations regulations for several classes of U.S. vessels of 1,600 gross tons or more be amended requiring maneuvering information to be posted in the pilothouse. After many comments a second notice of proposed rulemaking was published in July 1973.

The requirements, that information on the maneuvering characteristics of certain vessels be "prominently displayed in the pilothouse on a "fact sheet" were made applicable to U.S. vessels of 1,600 gross tons or over in February 1975. These same requirements were made applicable to foreign vessels of 1,600 gross tons or more when operating on the navigable waters of the United States in June 1977.

These U.S. Coast Guard regulations (13) require that vessels of 1,600 gross tons and over have the following maneuvering information prominently displaced on a "fact sheet" in the wheelhouse:

a. Turning circle diagrams showing time and distance of advance and transfer required to alter course 90 degrees to port and starboard for full and half speed using maximum rudder angle and constant power settings.

b. Time and distance to stop the vessel from full and half speed while mantaining approximately the initial heading with minimum application of rudder.

c. Information on vessel speed as a function of propeller shaft revolutions per minute for a representative range of speeds (or pitch control settings for ships with controllable pitch propellers.

d. Information on the effectiveness of any auxiliary maneuvering devices with which the ship is equipped as a function of ship's speed. Auxiliary maneuvering devices include bow thrusters. The regulations actually call for "a table of vessel speeds at which the auxiliary device is effective in maneuvering the vessel."

Maneuvering information is required to be provided for both normal load and normal ballast conditions. The information should reflect the vessel's expected performance in calm weather (wind 10 knots or less, calm sea),no current, deep water conditions (water depth twice the vessel's draft or greater), and with a clean hull. The "fact sheet" must include a warning statement indicating that the vessel's response may be different if weather, water depth, hull fouling, draft, or trim are different from those to which maneuvering data correspond.

The information on the "fact sheet" for U.S. vessels must be verified within six months after the vessel is placed in service, or, if corrections are found necessary, modified six months after the vessel is placed into service and verified within three months after it has been modified. Vessels of unusual design, such as semi-submersible mobile drilling units, hydrofoils and hovercraft are considered on a case-by-case basis.

OCMIF Maneuvering Fact Sheet

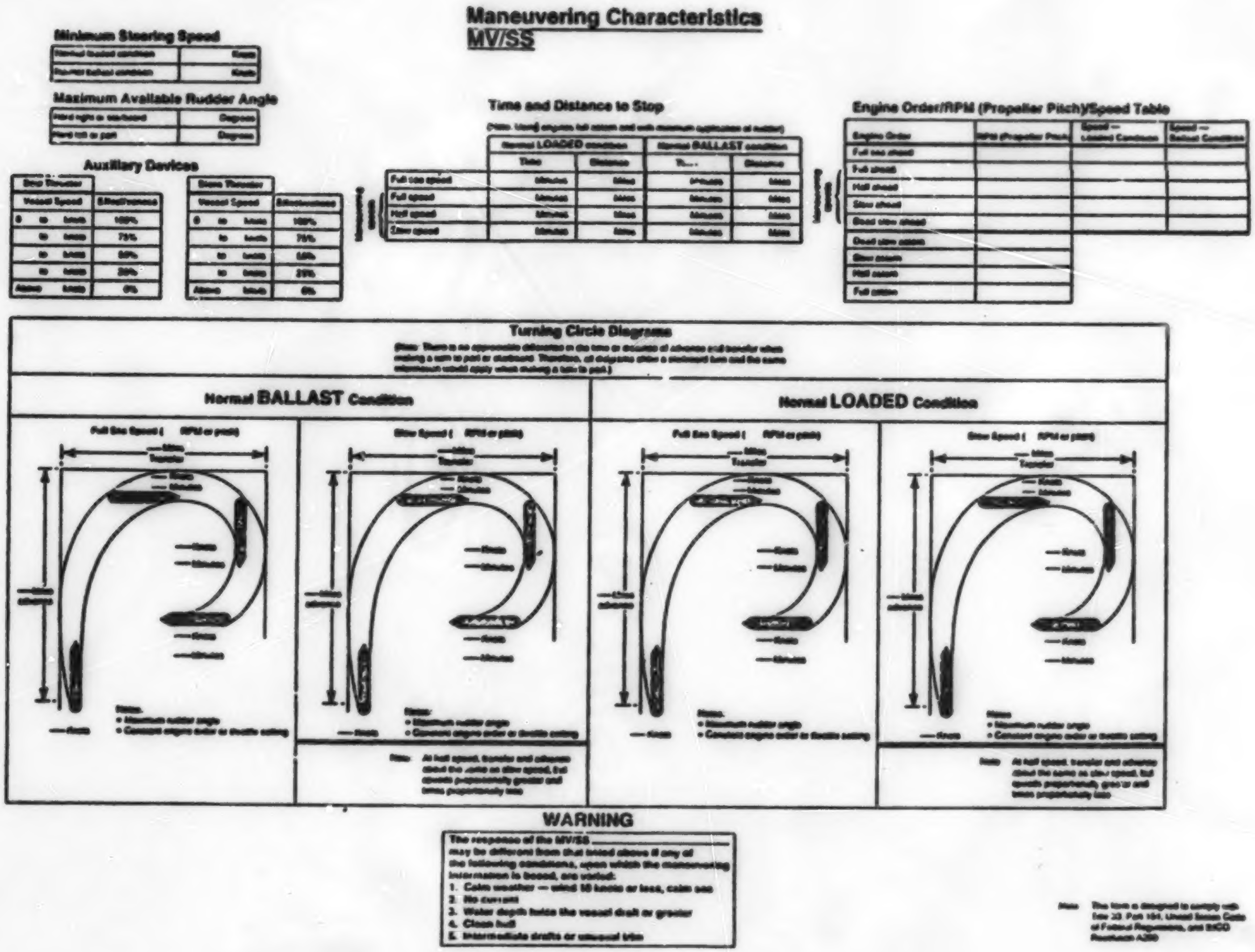
In anticipation of the USCG rules requiring vessels entering U.S. waters to have shipboard maneuvering information, the Oil Companies International Marine Forum (OCIMF) developed a standard format for member companies to use. This format is shown in Fig. 12. Prior to this effort "fact sheet's from each operating company were developed and presented in widely varying formats.

Implementation of IMCO Resolution by Other Countries

Implementation of IMCO Resolutions 160 (ES. iv) (1) and A. 209 (VII) (10) has varied from country to country and some nations have not adopted the resolutions. The Federal Republic of Germany applied the entire resolution to all ships greater than 100 meters in length and to all gas and chemical tankers. In addition, they added the following paragraphs to Part 2 of the Resolution (14):

> (v) "The stopping distance of large vessels may be reduced to a considerable extent by putting the rudder hard-over alternatively to port and starboard. Reductions of stopping distance by 30 to 50 percent have been recorded.
>
> (vi) It is recommended that ahead data be compiled, using an approved method, for the stopping distances of a given ship for various loaded and/or ballast conditions based on general information furnished already prior to the vessel's coming into service, in order to obtain information and details on the vessl's maneuvering and stopping behaviour at different engine revolutions. The predetermined figures should be tested by practical methods, as outlined in Part 1, paragraph (iii) of the Recommendation."

Norway has also implemented the resolutions, but with a different size



Maneuvering Characteristics MV/SS

Minimum Steering Speed

Normal loaded condition	Knots
Normal ballast condition	Knots

Maximum Available Rudder Angle

Hard right or starboard	Degrees
Hard left or port	Degrees

Auxiliary Devices

Bow Thruster	
Vessel Speed	Effectiveness
0 to knots	100%
to knots	75%
to knots	50%
to knots	25%
Above knots	0%

Stern Thruster	
Vessel Speed	Effectiveness
0 to knots	100%
to knots	75%
to knots	50%
to knots	25%
Above knots	0%

Time and Distance to Stop

	Normal LOADED condition		Normal BALLAST condition	
	Time	Distance	Time	Distance
Full sea speed	Minutes	Miles	Minutes	Miles
Full speed	Minutes	Miles	Minutes	Miles
Half speed	Minutes	Miles	Minutes	Miles
Slow speed	Minutes	Miles	Minutes	Miles

Engine Order/RPM (Propeller Pitch)/Speed Table

Engine Order	RPM (Propeller Pitch)	Speed — Loaded Condition	Speed — Ballast Condition
Full sea ahead			
Full ahead			
Half ahead			
Slow ahead			
Dead slow ahead			
Dead slow astern			
Slow astern			
Half astern			
Full astern			

Turning Circle Diagrams

Normal BALLAST Condition

Normal LOADED Condition

Full Sea Speed (RPM or pitch)
Slow Speed (RPM or pitch)
Full Sea Speed (RPM or pitch)
Slow Speed (RPM or pitch)
Miles
Transfer
Knots
Minutes
Advance

WARNING

The response of the MV/SS ______________
may be different from that listed above if any of the following conditions, upon which the maneuvering information is based, are varied:

1. Calm weather — wind 10 knots or less, calm sea
2. No current
3. Water depth twice the vessel draft or greater
4. Clean hull
5. Intermediate drafts or unusual trim

Fig. 12 Oil Companies International Marine Forum Standard Format

range for application. All ships greater than 50,000 gross tons and all chemical tankers, LPC/LNG ships and passenger ships of 10,000 gross tons and above were included.

Apparently both Norway and the Federal Republic of Germany were comfortable with the provisions of the Resolution dealing with minimum maneuvering speed. The United States did not adopt this portion of IMCO's recommendation because of the lack of an agreed speed criteria for maneuverability.

When comparing approaches to implementating the Resolutions, it is noteworthy that only the United States requires maneuvering information of foreign flag ships when in U.S. waters. The authors know of no other country where the IMCO recommendations are required for other than their own ships.

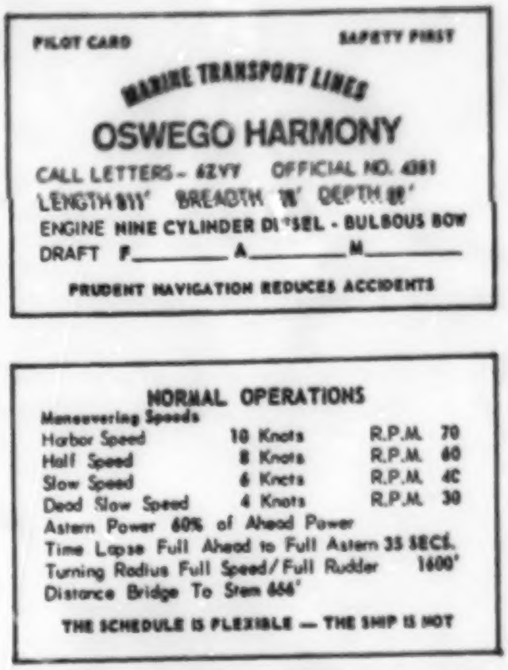
Pilot-Master Information Exchange Programs

Traditional communication between master and pilot has consisted of minimal verbal information exchange. At least one company also provides a "Pilot Card" that the master gives to the pilot as shown in Fig. 13. Because navigation and control of vessels are most critical in pilotage waters several companies have developed an even more detailed scheme for formalized exchange of information between the master and pilot. The form not only provides information about the vessel but also features information transfer from the pilot. Eight questions about the port and proposed passage provide the masters with insight into the pilot's actions and allow the pilot and master to reach agreement before important maneuvers are initiated. This form is then filled out and signed by both pilot and master. These formal information exchange programs seem to have been well received by the companies, masters, and pilots involved, when conditions allow for such exchanges.

In addition to the questions on Fig. 14, the pilot could also pass to the master: speeds he will require; any navigation restrictions; status of navigational aids; expected traffic conditions; any other information critical to the safe passage; and any special requirements he may have.

Maneuvering Predictors

Electronic computers hold great promise for the future of onboard use of maneuvering data. Automatic Radar Plotting Aids (ARPAs) or collision avoidance systems already incorporate some trajectory prediction capabilities. One great strength of tomorrow's maneuvering predictors is in the training area when not in actual operations. Master, mate, and pilot ship handling skills could be significantly boosted through practice in the variety of situations that can be provided by on board simulators. The master, as the one with ultimate responsibility, will also be able to use the device to project the effects of pilot commands and thus help make decisions necessary for the safety of the ship.



PILOT CARD SAFETY FIRST

MARINE TRANSPORT LINES

OSWEGO HARMONY

CALL LETTERS - 6ZVY OFFICIAL NO. 4381
LENGTH 811' BREADTH [illegible]' DEPTH [illegible]'
ENGINE NINE CYLINDER DIESEL - BULBOUS BOW
DRAFT F________ A________ M________

PRUDENT NAVIGATION REDUCES ACCIDENTS

NORMAL OPERATIONS

Maneuvering Speeds

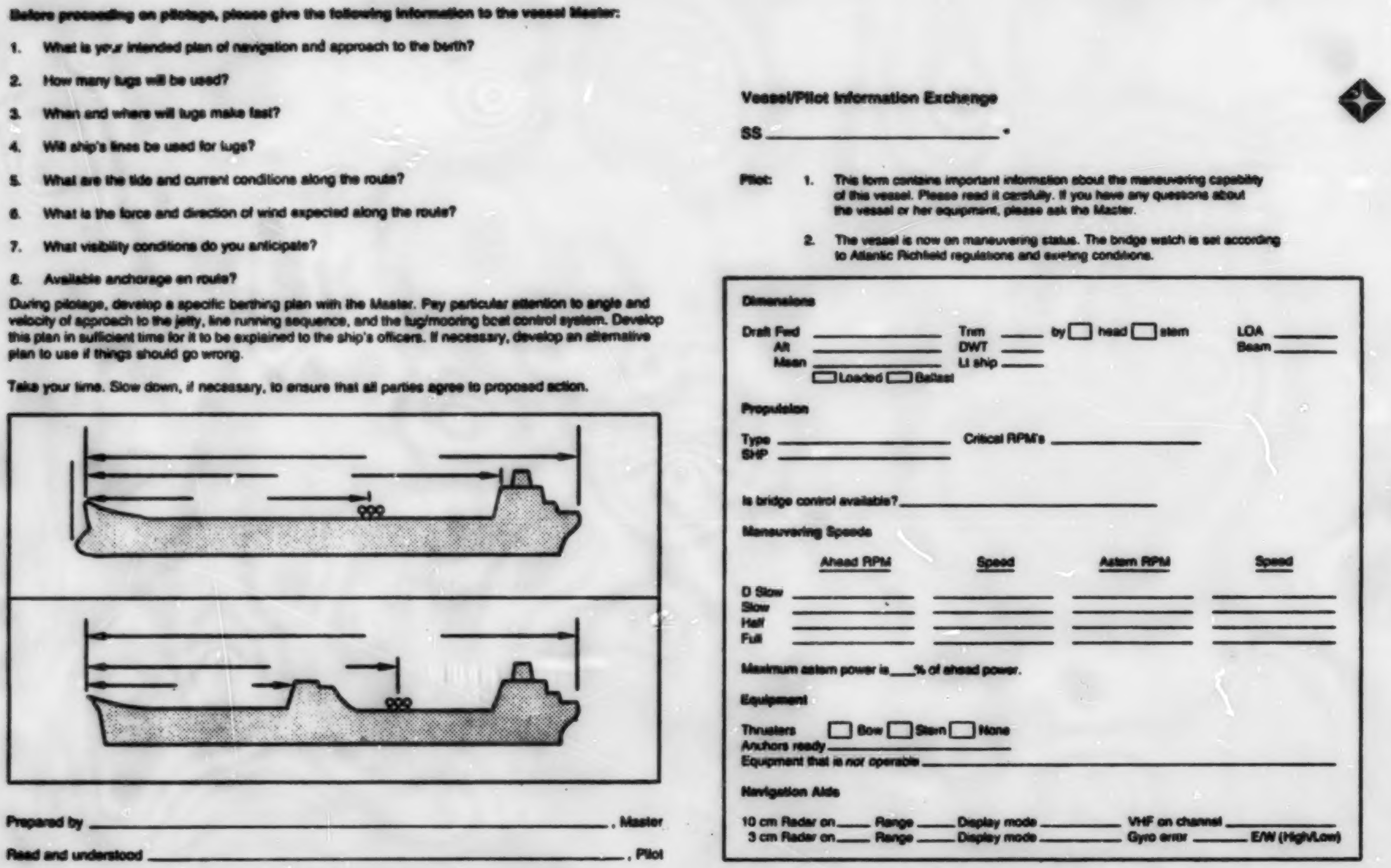
Harbor Speed	10 Knots	R.P.M. 70
Half Speed	8 Knots	R.P.M. 60
Slow Speed	6 Knots	R.P.M. 40
Dead Slow Speed	4 Knots	R.P.M. 30

Astern Power 60% of Ahead Power
Time Lapse Full Ahead to Full Astern 35 SECS.
Turning Radius Full Speed/Full Rudder 1600'
Distance Bridge To Stem 666'

THE SCHEDULE IS FLEXIBLE — THE SHIP IS NOT

Fig. 13 Marine Transport Lines "Pilot Card"

Dependability and accuracy are still problems in the development of maneuvering predictors, but they are coming and their applications are many. Reference 15 has already began to look into standardization problems with advanced maneuvering predictor displays. The certainty that these devices will be heavily used is evidenced by the general popularity of today's computer games.



Before proceeding on pilotage, please give the following information to the vessel Master:

1. What is your intended plan of navigation and approach to the berth?
2. How many tugs will be used?
3. When and where will tugs make fast?
4. Will ship's lines be used for tugs?
5. What are the tide and current conditions along the route?
6. What is the force and direction of wind expected along the route?
7. What visibility conditions do you anticipate?
8. Available anchorage en route?

During pilotage, develop a specific berthing plan with the Master. Pay particular attention to angle and velocity of approach to the jetty, line running sequence, and the tug/mooring boat control system. Develop this plan in sufficient time for it to be explained to the ship's officers. If necessary, develop an alternative plan to use if things should go wrong.

Take your time. Slow down, if necessary, to ensure that all parties agree to proposed action.

Prepared by ________________________________, Master

Read and understood ________________________________, Pilot

Vessel/Pilot Information Exchange

SS ________________________________

Pilot:

1. This form contains important information about the maneuvering capability of this vessel. Please read it carefully. If you have any questions about the vessel or her equipment, please ask the Master.
2. The vessel is now on maneuvering status. The bridge watch is set according to Atlantic Richfield regulations and existing conditions.

Dimensions

Draft Fwd __________ Trim _____ by ☐ head ☐ stern LOA ________

Aft __________ DWT _____ Beam ________

Mean __________ Lt ship _____

☐ Loaded ☐ Ballast

Propulsion

Type __________ Critical RPM's __________

SHP __________

Is bridge control available? ____________________

Maneuvering Speeds

	Ahead RPM	Speed	Astern RPM	Speed
D Slow				
Slow				
Half				
Full				

Maximum astern power is ___% of ahead power.

Equipment

Thrusters ☐ Bow ☐ Stern ☐ None

Anchors ready ____________________

Equipment that is *not* operable ____________________

Navigation Aids

10 cm Radar on _____ Range _____ Display mode ________ VHF on channel __________

3 cm Radar on _____ Range _____ Display mode ________ Gyro error _______ E/W (High/Low)

Fig. 14 Atlantic Richfield "Vessel/Pilot Information Exchange" Form

APPENDIX D

ANALYSIS OF CASULATY DATA POTENTIALLY RELATED TO SHIP MANEUVERING PERFORMANCE

APPENDIX D

D-1 Identification of Relevant Casualty Data

In order to determine if a correlation existed between casualty and maneuvering performance data, a listing of all collisions, rammings and groundings which occurred for the five year period from 1975-1979 was provided by the Coast Guard. This listing was obtained for the ship and operating conditions listed in Table D-1 from the Coast Guard Casualty Data Base, which is briefly described in Reference D-1. Only ships with four or more entries were considered further. Table D-2 indicates the distribution of number of casualties with number of ships; the generally normal distribution of these data is encouraging.

It is clear from the listing of "primary causes" in Reference D-1, that many collisions, rammings and groundings are due to mechanical failures or other factors which are not related to ship maneuvering performance. Those primary causes which might be related in part or in whole to ship maneuverability were identified. These are given in Table D-3. A new, reduced casualty list, which was restricted to ships with four or more total casualties and two or more maneuverability related primary causes, was developed. This list, including ship name, type and principal characteristics, is given in Table D-4. Table D-5 indicates the distribution of number of casualties with number of ships.

The ships listed in Table D-4 were sorted to identify ships with identical or similar principal dimensions. A total of 13 groups or classes of ships, with similar dimensions, were identified. These dimensions were used as input to program SMDB to identify corresponding ships in the maneuvering performance data file. Only one correspondence of dimensions was found. Seven groups had dimensions similar to ships in the maneuvering file, but closer examination indicated that there were no other direct correspondences.

D-2 Applicability of Casualty Data

The results of this phase of the study were thus rather disappointing. It was not possible to establish any correlation between the casualty data

/80

and the maneuvering data for particular ships or ship classes. Some comments on the casualty data analysis are given below.

The results indicate that few large tanker casualties appear to result from poor ship maneuverability. Only one tanker larger than 100,000 DWT had more than one accident which might be related to ship maneuverability.

At least one class of U.S. flag LNG ships is known to have poor handling characteristics and to have experienced several casualties, but no LNG ship casualties were identified in the data base. This is undoubtedly due to the fact that most U.S. flag LNG ship operations have occurred during the past two years and casualty data for this period had not entered the casualty data base at the time the printout was obtained.

A review of the casualty data indicated that casualties had occurred with multiple ships of the same class. Any valid comparison of casualty and maneuvering data would therefore require determining the total number of ships in a class and the total number of casualties for ships in this class, as well as knowing the maneuvering characteristics of a ship in this class. Identification of ship data by ship class was beyond the scope of this study.

Finally, direct correspondence was found for only one ship or ship class which appeared in both the relevant casualty data and the maneuvering performance data. This was for a class of Lykes cargo ships, the C3-5-37 class. No other direct correspondences were found, although some correspondences may have been masked by changes in ship name.

Despite these discouraging results, it is felt that correlation of casualty and maneuvering data for given ships and ship classes could provide a useful basis for establishing maneuvering performance standards. It would be desirable to broaden the examination of the casualty data base, particularly by increasing the period of interest from five to ten or fifteen years.

TABLE D-1

SPECIFIED LIMITS FOR SEARCH OF U. S. COAST GUARD SHIP CASUALTY DATA BASE

Period -

Last five years of available data (1975-1979)

Types of Vessels -

Cargo (02)*, Passenger over 100 gross tons (10), Tankships (17), Public-passenger (19), Public-cargo (20), Public-tanker (21), Public-other (22)

Flag -

U.S. Flag only

Vessel Gross Tonnage -

Over 1000 tons

Nature of Casualty -

01 - Collision with vessel, meeting situation
02 - Collision with vessel, crossing situation
03 - Collision with vessel, overtaking situation
04 - Collision with vessel anchored or moored (use only if not docking/undocking)
05 - Collision with vessel while docking or undocking
09 - Collision with Fixed Objects, piers, bridges, locks and dam
11 - Collision with aids to navigation, fixed or floating
12 - Collision, other than with vessel, NOC (Offshore Rigs - Seaplanes)
21 - Groundings with damage
22 - Groundings, no damage (cannot have monetary damage to vessel listed)

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*Number refers to codes in Reference 1

BEST DOCUMENT AVAILABLE

[redacted]

TABLE D-2

STATISTICS OF ALL COLLISIONS, RAMMINGS, AND GROUNDINGS FOR FIVE YEAR PERIOD FOR SPECIFIED SHIP TYPES AND SIZES

Number of Casualties		Number of Ships
14		1
13		1
12		0
11		3
10		3
9		5
8		15
7		13
6		24
5		49
4		201
	Total	315

TABLE D-3

PRIMARY CAUSES OF CASUALTIES ASSUMED TO BE POTENTIALLY RELATED TO SHIP MANEUVERING PERFORMANCE

1.	Personnel Fault (01-08, 11)	o Misjudged effects o Maneuvering without proper assistance
2.	Storms, Heavy Weather, Adverse Weather (12, 13)	o Gale force winds o Small craft warnings o Large swell
3.	Unusual Currents (14)	o Erratic current o Strong/narrow channel o Strong surge o Agreement reached
4.	Shear, Suction, Bank Cushion (15)	o Narrow channel o Navigating too close to shore
5.	Restricted Maneuvering Room (17)	
6.	Insufficient Horsepower/Inadequate Tug Assistance (36)	o No tugs available o Not enough tugs ordered o Unable to control tow o Other

TABLE D-4

LISTING OF SHIPS HAVING TWO OR MORE CASUALTIES POTENTIALLY RELATED TO SHIP MANEUVERING PERFORMANCE

Ship Official Number	Ship Name	Displacement (full load) Tons	LBP (m)	Beam (m)	Draft (m)	Type Ship	Number of Related Faults
550520	Roger M. Kyes	21391	202	23.8	8.5	BLK	8
536671	Almeria Lykes	57370	220	32.3	11.9	CNT	7
243406	Richard J. Reiss	19263	184	18.3	7.3	BLK	7
222512	John A. Kling	-	167	17.1	6.3	BLK	7
201842	Triumph, Convoy, Russell						6
529399	Marine Chemist	45906	194	27.1	11.0	TNK	6
278853	Adam E. Cornelius	-	198	22.0	8.3	BLK	6
203978	Unknown						6
202542	Wiliam G. Mather, Nicolet	-	159	18.3	6.6	BLK	5
289873	Marjorie Lykes	22880	173	21.0	9.2	CAR	5
264391	Sparrows Point	30200	208	21.3	8.0	BLK	5
557149	El Taino, Caguas						5
516600	Delta Uraguay, Del Valle	19285	148	21.3	9.5	CAR	5
297384	Mormacrigel						5
247490	Marine Angle, McKee Sons	-	190	21.8	8.2	BLK	4
561453	Green Harbor, William Hooper						4
203582	Henry A. Hawgood, W.W. Holloway	62314	243	30.5	12.4	BLK	4
242426	Monmouth	36925	196	22.6	10.15	TNK	4
559623	Green Valley, Button Gwinnett	62314	243	30.5	12.4	BLK	4
243412	Clarence B. Randall, Ashland	21810	184	18.3	7.6	BLK	4

BLK: Bulk Carrier, CNT: Container, TNK: Tanker, CAR: General Cargo, PASS: Passenger Ship, TW: Twin Screw, STW: Stern Wheel, TUG: Tug Ship

TABLE D-4 (Continued)

Ship Official Number	Ship Name	Displacement (full load) Tons	LBP (m)	Beam (m)	Draft (m)	Type Ship	Number of Related Faults
280946	Arthur B. Homer	41800	246	22.9	8.6	BLK	4
295249	Gulf Banker	11367	143	21.0	9.8	CAR	4
528567	Edger M. Queeny	46243	192	27.4	11.2	TNK	4
536500	Doctor Lykes	55660	220	32.3	11.9	CNT	4
226276	George M. Humphrey, Consumers Power	-	179	18.3	6.6	BLK	3
248326	Archers Hope, Sharon	-	200	20.7	8.2	BLK	3
287103	Jean Lykes	22880	173	21.0	9.2	CAR	3
266534	Wolvering Mariner George Walton	22636	161	23.2	9.6	CAR	3
556139	Saturn	-	114	16.6	5.9	TNK	3
243911	J.H. Hillman, Jr., Crispin Oglebay	22309	184	18.3	24.8	BLK	3
249354	Scott E. Land, Thomas F. Patton	-	178	21.8	7.6	BLK	3
214747	Eugene W. Pargny	-	177	18.3	-	BLK	3
243685	John T. Hutchinson	20925	184	18.3	7.3	BLK	3
269028	Golden Bear, Lyman Hall	30927	161	23.2	9.6	CAR	3
276270	Esso Lexington, Exxon Lexington	51549	209	28.4	11.8	TNK	3
517217	Robesca						3
530141	China Bear Austral Rainbow	44606	221	30.5	10.7	CNT	3
242260	Benjamin F. Fairless	24975	190	20.4	7.6	BLK	3
261423	Atlantic Navigator, Cove Navigator	41507	191	25.9	10.9	TNK	3

TABLE D-4 (Continued)

Ship Official Number	Ship Name	Displacement (full load) Tons	LBP (m)	Beam (m)	Draft (m)	Type Ship	Number of Related Faults
266181	Cotton Mariner, American Argosy	26500	191	23.2	9.0	CNT	3
283897	Texas Sun	67131	216	31.1	15.5	TNK	3
285171	Del Sol	18999	147	21.3	9.5	TNK	3
287381	Export Builder, Builder	19400	143	22.2	9.3	CAR	3
287683	Philipine Bear Thomas Nelson	22630	161	23.2	9.6	CAR	3
291020	American Chieftain	21053	161	22.9	9.6	CAR	3
517186	Overseas Audrey, Overseas Valdez	46243	192	27.4	11.2	TNK	3
520839	Eagle Leader Ogden Leader	46243	192	27.4	11.2	TNK	3
569400	Maine, Tyson Lykes						3
207272	Leonard B. Miller, Buckeye	-	156	16.5	6.5	BLK	3
247576	Winter Hill Leon Falk Jr.	-	216	22.9	8.5	BLK	3
290262	C.E. Dant Santa Ana	22629	161	23.2	9.6	CAR	3
500702	Elizabeth Lykes	21840	157	23.2	10.0	CAR	3
541563	Chevron California	85090	240	32	13.3	TNK	3
535000	Puerto Rican	46243	192	27.4	11.2	TNK	2
246103	Esso Roanoke Baltimore	19690	144	21.8	9.2	CNT	2
268216	Flying A California, Lion of California	21815	149	20.7	9.3	TNK	2
296404	Gulf Trader	17210	143	21.0	9.2	CAR	2

TABLE D-4 (Continued)

Ship Official Number	Ship Name	Displacement (full load) Tons	LBP (m)	Beam (m)	Draft (m)	Type Ship	Number of Related Faults
529795	Overseas Alaska	74401	216	32	13.2	TNK	2
550954	Hans-Hel						2
559035	San Houston	57082	243	30.5	11.6	BLK	2
207981	William B. Dickson, Merle M. McCurdy	-	179	17.7	6.4	BLK	2
257381	Esso Suez San Marcos	35200	183	25.2	10.2	TNK	2
276121	Socony 50 Mobil Champlain	-	91	13.2	-	TW TNK	2
521866	American Mail President Cleveland	31995	178	25.0	10.7	CAR	2
244855	Fisher's Hill American Trader	33946	184	22.6	10.0	TNK	2
247757	Camp Charlotte Louisiana Brimstone	34011	178	24.4	10.2	TNK	2
289699	American Challenger	21053	161	22.9	9.6	CAR	2
577636	Neveda Charles Lykes	33900	195	31.1	9.8	CNT	2
202770	Frank C. Ball J.R. Sensibar	-	182	17.1	6.4	BLK	2
244460	Chancellorsville	31522	172	24.4	10.2	TNK	2
248239	Marine Falcon Borinquen	32080	200	23.8	9.2	TW TUG	2
264652	Tar Heel Mariner John B. Waterman	13409	161	23.2	9.6	CAR	2
265748	New Jersey Sun	-	187	25.6	10.8	TNK	2
265762	Chicago Socony Mobil Chicago	5010	89	13.2	4.8	TW TNK	2

[redacted]

TABLE D-4 (Continued)

Ship Official Number	Ship Name	Displacement (full load) Tons	LBP (m)	Beam (m)	Draft (m)	Type Ship	Number of Related Faults
266910	California Texaco California	48401	209	27.4	11.4	TNK	2
270025	Eastern Sun	-	187	25.6	10.8	TNK	2
282772	John Lykes	22880	173	21.0	9.2	CAR	2
287416	Leslie Lykes	22892	173	21.0	9.2	CAR	2
291026	African Sun Cape Avinof	20110	165	22.9	9.4	CAR	2
530145	Lash Atlantico	44606	221	30.5	12.4	CNT	2
532410	SL-181 Sea-Land Economy	34628	206	29.0	10.4	CNT	2
552395	Paul Thayer	25746	186	20.7	7.8	BLK	2
564002	Sam Laud	28770	188	20.7	8.3	BLK	2
209185	Col. James M. Schoonmaker, Willis B. Boyer	-	183	19.5	6.8	BLK	2
225875	Delta Queen	-	76	17.7	-	STWPASS	2
241390	Geo. Whitelock II	-	74	11.3	3.8	TNK	2
245025	Hanging Rock Seattle	19690	144	21.8	9.2	CNT	2
245225	Newberg Delta Coneyor						2
248702	Marine Lynx Transcolumbia	21987	151	21.8	9.9	CAR	2
257395	(For: LST-1063) Polaris						2
264136	John G. Munson	34700	229	22.0	8.1	BLK	2
264207	Arthur M. Anderson	34000	228	21.3	8.0	CAR	2
269187	Detroit Edison	29555	202	22.0	8.0	BLK	2
270179	P.W. Thirtle Baltimore Trader	70553	235	31.1	12.2	TNK	2

[redacted]

TABLE D-4 (Concluded)

Ship Official Number	Ship Name	Displacement (full load) Tons	LBP (m)	Beam (m)	Draft (m)	Type Ship	Number of Related Faults
276034	Gulfprince	44840	192	27.4	10.9	TNK	2
277805	Kings Point Texaco Wisconsin	43125	192	27.4	10.9	TNK	2
277935	Saroula Sargula						2
280564	James Lykes	22892	173	21.0	9.2	CAR	2
281702	Achilles	52302	208	28.4	11.5	TNK	2
287875	Oregon Mormactide	22629	161	23.2	9.6	CAR	2
504982	Stella Lykes	21840	157	23.2	10.0	CAR	2
516542	Chicago San Juan	32900	201	23.8	9.2	CNT	2
522650	Mormacstar Jacket						2
530138	Golden Bear President Grant	44606	221	30.5	12.1	CNT	2
530142	Philippine Bear Austral Moon	44606	221	30.5	10.7	CNT	2
552818	Sea-Land Consumer	38742	206	29.0	10.4	CNT	2
556460	H. Lee White	40810	210	23.8	9.1	BLK	2
567835	Great Land	31762	224	28.0	-	CNT	2
571049	Zapata Patriot Patriot	44150	209	25.6	10.5	TNK	2
573093	Antona USNS Jupiter	33900	195	31.1	9.8	CNT	2
588001	Overseas New York	106496	261	32.2	15.0	TNK	2

TABLE D-5

STATISTICS OF CASUALTIES WHICH ARE POTENTIALLY RELATED TO SHIP MANEUVERABILITY

Number of Casualties		Number of Ships
8		1
7		3
6		4
5		6
4		10
3		30
2		58
	Total	112

REFERENCES

D-1 "Coding Instructions for Commercial Vessel Casualties," U.S. Coast Guard (G-MA) Headquarters, 1976, Washington, D. C.

APPENDIX E

LISTING OF SHIPS AND DATA CURRENTLY IN THE SHIP MANEUVERING DATA BASE

APPENDIX E

All data for all ships currently contained in the ship maneuvering data base are listed in the following table. As noted in the text, each ship is identified by its code number rather than by the name. The coding for these data are described in Table F-3 of Appendix F.

ORDER OF SHIPS IN DATA BASE

Ships 001 - 299:	Pages E-3 - E-76
Ships 300 - 325:	Pages E-108 - E-114
Ships 326 - 375:	Pages E-76 - E-88
Ships 376 - 425:	Pages E-114 - E-123
Ships 426 - 500:	Pages E-88 - E-105
Ships 501 - 590:	Pages E-123 - E-140
Ships 591 - 603:	Pages E-106 - E-108

```
$$$$$ SHIP #   1 $$$$$
     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 19.0    1.0    2.0  373.0  330.0  347.0   53.3   24.8    0.0    0.0  381.0   34.0   90.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHUV   TRLC
                 15.0  160.0    9.2 9999.0    2.0    1.0    4.0   42.5  -24.0    1.0    2.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 14.2 9999.0  -35.0   10.3    5.3   11.3 9999.0
                 14.5 9999.0  -35.0   10.8    4.6   10.6 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 14.2 9999.0    0.0   38.2 9999.0 9999.0   20.2   30.0

       ZIG-ZAG   SPDZ   RUDZ   OVS1   OVSF   OVSW   KPRM   TPRM   PERD
                 14.2   10.0    8.0   19.0 9999.0 9999.0 9999.0    8.0


$$$$$ SHIP #   2 $$$$$
     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 19.0    2.0    2.0  139.0  330.0  347.0   53.3    9.8    2.0    0.0  381.0   34.0   90.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHUV   TRLC
                 15.0  160.0    9.2 9999.0    2.0    1.0    4.0   88.1   -9.0    1.0    2.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 17.0 9999.0   35.0    9.2    3.1    9.6 9999.0
                 16.8 9999.0  -35.0   11.6    3.2    9.4 9999.0


$$$$$ SHIP #   3 $$$$$
     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 11.0    3.0    2.0  130.0  330.0  346.0   53.3    9.6   12.0    0.1  365.0   34.0   90.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHUV   TRLC
                 16.3  131.0    7.1 9999.0    2.0    1.0    4.0   90.5  -12.0    1.0    2.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 17.7 9999.0   35.0    6.9    2.1    6.2 9999.0
                 17.7 9999.0  -35.0    7.5    2.4    6.5 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 17.6 9999.0    0.0   12.8 9999.0    7.9   10.9   54.0


$$$$$ SHIP #   4 $$$$$
     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 99.0    4.0    2.0   86.0  286.0  304.0   43.3    8.4   17.0    0.1  175.0   24.0  100.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHUV   TRLC
                 15.2   69.0    7.6 9999.0    1.0    1.0    1.0   48.0   -5.0    4.0    2.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 18.3 9999.0   35.0    9.7    4.1   10.4   91.0
                 18.3 9999.0  -35.0    9.6    4.2   10.2   89.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
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                 10.2 9999.0    0.0   34.6 9999.0 9999.0   11.1   48.0

 ***** SHIP #    5 *****

      DIMENSION  NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 99.0     5.0     2.0   208.0   313.0  9999.0    48.2    16.4     1.0  9999.0   205.0    30.0    82.0
  RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    UNUV    TRLC
                 15.6    91.0     8.4  9999.0  9999.0     1.0     1.0  9999.0  9999.0     4.0     2.0
        TURNING  SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 16.3  9999.0    35.0    10.9     4.8    13.1  9999.0
                 15.6  9999.0   -35.0    12.0     4.9    12.7  9999.0
       STOPPING  SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 16.5  9999.0     0.0    62.6  9999.0  9999.0    24.9   217.0

 ***** SHIP #    6 *****

      DIMENSION  NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  4.0     6.0     5.0    44.0   261.0   246.0    32.5     8.6     1.0     0.4    61.0    22.0   116.0
  RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    UNUV    TRLC
                 19.1    38.0     6.0  9999.0     2.0     3.0     1.0    47.7  9999.0     1.0     2.0
        TURNING  SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
               9999.0  9999.0   -35.0     6.5     4.0     6.8  9999.0
               9999.0  9999.0   -20.0     7.4     4.5     8.8  9999.0
               9999.0  9999.0   -10.0     9.8     5.0    11.8  9999.0

 ***** SHIP #    7 *****

      DIMENSION  NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 20.0     7.0     3.0    36.0   262.0   244.0    32.3     6.0    55.0     0.4    90.0    19.0   117.0
  RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    UNUV    TRLC
                 14.2    45.0     6.4  9999.0     3.0     3.0     1.0    50.2    -8.0     1.0     2.0
        TURNING  SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 17.1  9999.0    15.0     6.5     2.0     6.2  9999.0
                 17.1  9999.0   -15.0     8.1     3.6     8.7  9999.0
       STOPPING  SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 17.1  9999.0     0.0    19.9  9999.0  9999.0     7.1   103.0
                 16.9  9999.0  9999.0    45.0  9999.0  9999.0  9999.0   311.0

 ***** SHIP #    8 *****

      DIMENSION  NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 18.0     8.0     2.0   139.0   258.0   272.0    38.9    16.3  9999.0     1.0   165.0    24.0   115.0
  RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    UNUV    TRLC
                 16.4    42.0     6.6  9999.0     1.0     3.0     1.0    26.0   -15.0     5.0     2.0
        TURNING  SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 16.0     4.0    35.0     9.0     2.6     7.0    86.0
                 16.0     3.8   -35.0     8.6     2.6     6.8    83.0
       STOPPING  SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 17.2  9999.0  9999.0    52.6    18.6    14.8    30.0   540.0
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***** SHIP #   9 *****

  DIMENSION     NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 7.0     9.0     8.0     7.0   134.0   133.0    20.0     5.1     1.0     0.0    11.0    16.0  9999.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                23.1    38.0     3.8  9999.0     2.0     4.0     4.0    39.1  9999.0     1.0     2.0

     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                23.1    15.0    35.0     5.0     2.2     6.5  9999.0

     ZIG-ZAG    SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                23.7    20.0     8.0     8.0  9999.0  9999.0  9999.0     2.2

***** SHIP #  10 *****

  DIMENSION     NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                14.0    10.0     5.0     8.0   144.0   132.0    20.4     4.4    91.0     0.0    19.0    11.0   118.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                20.5    20.0     5.4  9999.0     1.0     3.0     1.0    22.0    -9.0  9999.0     2.0

     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                20.5    14.0    35.0  9999.0  9999.0     8.5    90.0
                20.2    12.0   -35.0  9999.0  9999.0     8.1    81.0

    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                20.2   100.0     0.0    14.0  9999.0  9999.0     5.5   120.0

***** SHIP #  11 *****

  DIMENSION     NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                12.0    11.0     1.0   101.0   240.0   254.0    37.8    13.2     0.0  9999.0   100.0    18.0   115.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                15.5    43.0  9999.0  9999.0  9999.0     3.0     1.0  9999.0  9999.0     1.0     2.0

     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                15.8  9999.0    35.0     7.2     3.4     8.8  9999.0
                15.8  9999.0   -35.0     8.0     3.4     8.7  9999.0

    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                15.8  9999.0     0.0    21.5    21.0     7.5     8.2     7.0

***** SHIP #  12 *****

  DIMENSION     NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                20.0    12.0     3.0   105.0   163.0   171.0    24.8     9.1  9999.0     0.7    34.0    34.0   115.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                16.0    29.0     5.6  9999.0     2.0     3.0     1.0    10.8   -16.0     5.0     2.0

     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                15.6     9.7    36.0     5.9     3.6     6.4    90.0
                15.5     9.2   -36.0     5.5     3.1     5.9    89.0

***** SHIP #  13 *****

  DIMENSION     NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 1.0    13.0     6.0    20.0   190.0   204.0    27.4     7.0    29.0     0.0    31.0    26.0   103.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
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              22.6    42.0     7.2 9999.0     2.0     1.0     1.0    39.1  -11.0     1.0     2.0

     TURNING  SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
            9999.0 9999.0     35.0     8.1     5.1    11.5 9999.0
            9999.0 9999.0     35.0     8.4     5.3    11.6 9999.0

    STOPPING  SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TINS    TIMR
            9999.0 9999.0      0.0 9999.0    11.2 9999.0      2.8    18.0

$$$$$ SHIP #  14 $$$$$

   DIMENSION  NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    BDIS    SSHP    SRPM
               1.0    14.0     6.0    26.0   234.0   248.0    27.4     6.8    55.0     0.0    43.0    26.0   103.0

RUDDER, PROP  SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
              22.0    42.0     7.2 9999.0     2.0     1.0     1.0    48.7  -13.0     1.0     2.0

     TURNING  SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
            9999.0 9999.0     35.0     9.3     6.4    13.4 9999.0
            9999.0 9999.0     35.0    10.5     7.6    15.3 9999.0

    STOPPING  SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TINS    TIMR
            9999.0 9999.0      0.0 9999.0    17.9 9999.0      6.0    18.0

$$$$$ SHIP #  15 $$$$$

   DIMENSION  NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    BDIS    SSHP    SRPM
              13.0    15.0     6.0    13.0   168.0   182.0    25.0     5.7    36.0     0.0    22.0    22.3   400.0

RUDDER, PROP  SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
              21.0    23.0     5.7 9999.0     2.0     4.0     1.0    27.5   -9.0     1.0     2.0

     TURNING  SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
              24.6 9999.0     37.0     5.7     3.2     6.6    92.0
              24.8 9999.0    -36.0     6.4     3.0     7.1    92.0

    STOPPING  SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TINS    TIMR
              10.5 9999.0      0.0     3.1 9999.0 9999.0      2.5     5.0

     ZIG-ZAG  SPDZ    RUDZ    OVS1    OVSF    OVSM    KPRM    TPRM    PERD
              23.5    10.0     8.0     9.0 9999.0 9999.0 9999.0     2.0

$$$$$ SHIP #  16 $$$$$

   DIMENSION  NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    BDIS    SSHP    SRPM
              20.0    16.0     3.0     2.0    43.0    46.0    15.3     2.6     0.0     0.0     4.0     0.8   302.0

RUDDER, PROP  SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
               9.0     7.0     1.8 9999.0     5.0     3.0     4.0     3.5   -5.0     5.0     2.0

     TURNING  SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
              10.5 9999.0     35.0     1.8     0.7     2.0 9999.0
              10.5 9999.0    -35.0     2.4     0.6     2.3 9999.0

$$$$$ SHIP #  17 $$$$$

   DIMENSION  NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    BDIS    SSHP    SRPM
              10.0    17.0     3.0     6.0    88.0    93.0    16.2     5.5     0.0     0.6     6.0     2.6   212.0

RUDDER, PROP  SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
              12.5    13.0     2.7 9999.0     2.0     4.0     4.0     5.5   -8.0 9999.0     2.0
     ZIG-ZAG    SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                 7.0    10.0     4.0     4.0  9999.0  9999.0  9999.0  9999.0

***** SHIP #  18 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                20.0    18.0     3.0    23.0   186.0   196.0    26.5     6.2    22.0     1.0    46.0    11.0   118.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                17.7    22.0     5.8  9999.0     5.0     3.0     1.0    25.7    -7.0     1.0     2.0

     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
              9999.0  9999.0    35.0     6.5     2.6     6.4   100.0
              9999.0  9999.0   -35.0     5.2     2.2     5.8   100.0

***** SHIP #  19 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 1.0    19.0     2.0   285.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0    32.0    86.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                15.7  9999.0  9999.0  9999.0  9999.0     3.0  9999.0  9999.0  9999.0  9999.0     2.0

    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                15.9  9999.0     0.0    32.3  9999.0  9999.0    12.5  9999.0
                15.9  9999.0     0.0    26.9  9999.0  9999.0    11.1  9999.0

***** SHIP #  20 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 1.0    20.0     2.0   285.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0    32.0    86.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                16.3  9999.0  9999.0  9999.0  9999.0     1.0  9999.0  9999.0  9999.0  9999.0     2.0

    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                16.3  9999.0     0.0    40.9  9999.0  9999.0    20.3  9999.0

***** SHIP #  21 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 1.0    21.0     2.0   220.0   305.0  9999.0    47.2    18.5  9999.0  9999.0   225.0  9999.0    80.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                16.0  9999.0     8.9  9999.0  9999.0  9999.0     1.0  9999.0  9999.0     1.0     4.0

     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                16.0  9999.0    20.0    12.6  9999.0    12.6  9999.0
                16.0  9999.0   -20.0    12.9  9999.0    13.0  9999.0
                16.0  9999.0    35.0    10.1  9999.0     9.9  9999.0
                16.0  9999.0   -35.0    10.2  9999.0    10.1  9999.0

     ZIG-ZAG    SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                16.0    20.0    13.0    14.0     0.0  9999.0  9999.0     7.8

***** SHIP #  22 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 1.0    22.0     2.0   220.0   305.0  9999.0    47.2    18.5  9999.0  9999.0   225.0  9999.0    80.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
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                 16.0 9999.0    8.9 9999.0 9999.0 9999.0    1.0 9999.0 9999.0    1.0    2.0

      TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 16.0 9999.0   35.0   12.4 9999.0    9.4 9999.0
                 16.0 9999.0   35.0   11.3 9999.0   10.2 9999.0
                 16.0 9999.0  -35.0   12.6 9999.0    9.8 9999.0
                 16.0 9999.0  -35.0   10.6 9999.0    9.5 9999.0

      ZIG-ZAG    SPDZ   RUDZ   OVS1   OVSF   OVSW   KPRM   TPRM   PERD
                 16.0   20.0   17.0   16.0    0.0 9999.0 9999.0    7.8

$$$$$ SHIP #  23 $$$$$

    DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  4.0   23.0    2.0  245.0  312.0 9999.0   46.4   19.5    0.0    1.0  245.0 9999.0   80.0

 RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                 16.0  105.0    8.8 9999.0    2.0 9999.0    1.0 9999.0 9999.0 9999.0    2.0

      TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 15.0    5.6   35.0   11.4 9999.0    7.2 9999.0

      ZIG-ZAG    SPDZ   RUDZ   OVS1   OVSF   OVSW   KPRM   TPRM   PERD
                 15.6   20.0   11.0   15.0    5.9    0.5   -3.8    9.5

$$$$$ SHIP #  24 $$$$$

    DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  1.0   24.0    2.0  245.0  312.0 9999.0   46.4   19.5    0.0    1.0  245.0 9999.0   80.0

 RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                 16.0  105.0    8.8 9999.0    2.0 9999.0    1.0 9999.0 9999.0 9999.0    5.0

      TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 15.0    6.0   35.0   11.5 9999.0    8.1 9999.0

      ZIG-ZAG    SPDZ   RUDZ   OVS1   OVSF   OVSW   KPRM   TPRM   PERD
                 15.6   20.0    7.0    8.0    5.4   -1.1    1.8   10.6

$$$$$ SHIP #  25 $$$$$

    DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  5.0   25.0    2.0  140.0  240.0  274.0   42.0   15.4    0.0    1.0  225.0   26.0  112.0

 RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                 17.2   62.0    7.0   18.0    5.0    3.0    1.0   36.0   -8.0    6.0 9999.0

      TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 14.6 9999.0   35.3    8.1    3.4 9999.0 9999.0
                 16.0 9999.0  -36.0    8.8    3.2 9999.0 9959.0

     STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 15.8  100.0    0.0   48.8   48.8   10.0   16.6 9999.0

$$$$$ SHIP #  26 $$$$$

    DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  5.0   26.0    2.0  122.0  245.0  259.0   40.0   15.1    0.0    0.5  164.0   26.0  112.0

 RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                 17.3   53.0    6.9    8.7    5.0    1.0    1.0   32.0   -9.0    2.0 9999.0
     TURNING      SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  14.5  9999.0    35.0     4.9     3.2  9999.0  9999.0
                  14.0  9999.0   -35.0     6.7     2.8  9999.0  9999.0

    STOPPING      SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  16.6   100.0     0.0    40.3    40.3    16.7    13.6  9999.0


$$$$$ SHIP #  27 $$$$$

   DIMENSION      NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0    27.0     2.0   146.0   255.0   265.0    42.0    16.5     0.0     0.3   210.0    23.0   115.0

RUDDER, PROP      SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                  16.7    62.0     6.7    17.0     5.0     3.0     1.0    31.0    -7.0     2.0  9999.0

     TURNING      SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  16.6  9999.0    35.1     8.2     3.6  9999.0  9999.0
                  16.6  9999.0   -35.1     9.0     3.5  9999.0  9999.0

    STOPPING      SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  14.5   100.0     0.0    36.0    36.0     6.6    14.6  9999.0


$$$$$ SHIP #  28 $$$$$

   DIMENSION      NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0    28.0     1.0    85.0   235.0   246.0    36.5    12.0     0.0     0.1   132.0    20.0   115.0

RUDDER, PROP      SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                  17.1    44.0     6.4    14.0     5.0     3.0     1.0     2.9    -4.0     1.0  9999.0

     TURNING      SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  16.6  9999.0    35.5     6.1     2.8  9999.0  9999.0
                  12.8  9999.0   -34.0     7.4     3.0  9999.0  9999.0

    STOPPING      SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  16.4   100.0     0.0    40.6    40.6     5.4    14.5  9999.0


$$$$$ SHIP #  29 $$$$$

   DIMENSION      NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0    29.0     2.0   125.0   262.0   276.0    41.4    13.9     0.0     0.6   263.0    24.0   104.0

RUDDER, PROP      SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                  17.5    60.0     7.0     8.3     1.0     1.0     1.0    34.0   -12.0     2.0  9999.0

     TURNING      SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  17.1  9999.0    35.7     7.7     3.8  9999.0  9999.0
                  17.2  9999.0   -35.0     8.3     3.8  9999.0  9999.0

    STOPPING      SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  17.2   100.0     0.0     3.5     3.5     0.0     6.0  9999.0


$$$$$ SHIP #  30 $$$$$

   DIMENSION      NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0    30.0     2.0   102.0   239.0   248.0    37.2    12.0     0.0     0.3   133.0    21.0   118.0

RUDDER, PROP      SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                  17.0    47.0     6.4    16.0     5.0     3.0     1.0    34.0   -11.0     2.0  9999.0

     TURNING      SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  16.0  9999.0    36.0    10.1     4.0  9999.0  9999.0
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                  16.0 9999.0  -36.0    7.6    3.2 9999.0 9999.0

     STOPPING     SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  16.9  100.0    0.0   34.7   34.7   19.5   12.7 9999.0

    ***** SHIP #  31 *****

     DIMENSION    MATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   5.0   31.0    1.0   83.0  232.0  243.0   35.8   12.1    0.0    0.0  112.0   21.0  114.0
 RUDDER, PROP     SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                  17.0   43.0    6.7   10.4    5.0    3.0    1.0   33.0  -10.0    2.0 9999.0
       TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  14.0 9999.0   35.0    7.4    5.1 9999.0 9999.0
                  15.2 9999.0  -35.0    7.1    4.9 9999.0 9999.0

    ***** SHIP #  32 *****

     DIMENSION    MATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   5.0   32.0    2.0  103.0  234.0  245.0   37.0   14.4    0.0    1.0  137.0   21.0  114.0
 RUDDER, PROP     SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                  17.2   45.0    6.6   10.4    5.0    3.0    1.0   29.0   -9.0    2.0 9999.0
       TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  17.0 9999.0   35.0    7.7    4.0 9999.0 9999.0
                  17.0 9999.0  -35.0    7.5    4.4 9999.0 9999.0
      STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  17.0  100.0    0.0   29.4   29.4    6.0   11.5 9999.0

    ***** SHIP #  33 *****

     DIMENSION    MATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   5.0   33.0    2.0  122.0  246.0  258.0   40.2   14.9    0.0    1.0  173.0   23.0  114.0
 RUDDER, PROP     SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                  16.8   55.0    6.8    7.4    5.0    3.0    1.0   28.0   -9.0    3.0 9999.0
       TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  16.2 9999.0   35.0    7.2    5.0 9999.0 9999.0
                  16.2 9999.0  -35.0    7.3    4.7 9999.0 9999.0
      STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  16.2  100.0    0.0   27.0   27.0   12.0   13.0 9999.0

    ***** SHIP #  34 *****

     DIMENSION    MATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   5.0   34.0    2.0  143.0  265.0  278.0   44.2   15.1    0.0    0.6  199.0   28.0  114.0
 RUDDER, PROP     SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                  17.5   58.0    7.0   11.4    5.0    3.0    1.0   32.0   -7.0    3.0 9999.0
       TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  16.7 9999.0   35.0    8.7    5.2 9999.0 9999.0
                  16.7 9999.0  -35.0    9.2    4.8 9999.0 9999.0

    ***** SHIP #  35 *****
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      DIMENSION   NATH   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   5.0   35.0    2.0  154.0  274.0  289.0   45.6   14.8    0.0    0.7  218.0   28.0  114.0

   RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                  17.0   66.0    7.0   11.4    5.0    3.0    1.0   34.0   -8.0    3.0 9999.0

        TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  16.8 9999.0   35.0    8.4    5.0 9999.0 9999.0
                  16.8 9999.0  -35.0    8.9    6.5 9999.0 9999.0

       STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  16.8  100.0    0.0   24.0   24.0   22.0   13.2 9999.0


  $$$$$ SHIP #  36 $$$$$

      DIMENSION   NATH   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   5.0   36.0    3.0   28.0  213.0  223.0   31.1    4.0   36.0 9999.0   92.0   16.0  105.0

   RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                  17.6   32.0    6.6    6.0    5.0    1.0    1.0    3.3  -10.0    5.0 9999.0

        TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  17.1 9999.0   35.0    6.5    4.3 9999.0 9999.0
                  17.1 9999.0  -35.0    6.1    4.0 9999.0 9999.0

       STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  17.6  100.0    0.0   18.4   18.4    2.7    6.6 9999.0


  $$$$$ SHIP #  37 $$$$$

      DIMENSION   NATH   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   5.0   37.0    1.0   71.0  215.0  225.0   32.2   12.2    0.0    0.1   96.0   18.0  114.0

   RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                  17.3   35.0    6.6    8.0    5.0    3.0    1.0   19.0  -10.0    2.0 9999.0

        TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  17.3 9999.0   35.0    5.8    3.6 9999.0 9999.0
                  17.3 9999.0  -35.0    6.6    3.8 9999.0 9999.0

       STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  17.2  100.0    0.0   22.0   22.0    9.0    7.9 9999.0


  $$$$$ SHIP #  38 $$$$$

      DIMENSION   NATH   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   5.0   38.0    3.0   34.0  216.0  226.0   31.1    6.3   25.0    0.0   97.0   18.0  119.0

   RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                  17.3   33.0    6.2    7.0    5.0    3.0    1.0   31.0   -8.0    4.0 9999.0

        TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  17.3 9999.0   35.0    6.6    3.2 9999.0 9999.0
                  17.3 9999.0  -35.0    6.7    2.6 9999.0 9999.0

       STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  17.2  100.0    0.0   15.7   15.7    2.3    5.7 9999.0


  $$$$$ SHIP #  39 $$$$$

      DIMENSION   NATH   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   5.0   39.0    2.0  244.0  326.0  342.0   50.0   17.5    0.0    0.0  312.0   33.0  101.0
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RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                14.6    91.0     7.8  9999.0     5.0     1.0     1.0    25.0    -9.0     4.0  9999.0

     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                16.4     4.5    35.0     9.8     6.0  9999.0  9999.0
                15.5     4.3   -35.0     9.3     5.3  9999.0  9999.0

    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                16.6   100.0     0.0    35.1    35.1    26.4    20.9  9999.0

***** SHIP #  40 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 5.0    40.0     2.0   209.0   310.0   325.0    47.2    16.4     0.0     0.0   304.0    28.0    85.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                16.0    75.0     8.8  9999.0     5.0     1.0     1.0    32.0    -8.0     4.0  9999.0

     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                16.0     4.5    35.0    12.6     4.9  9999.0  9999.0
                15.0     4.9   -35.0     9.5     6.3  9999.0  9999.0

    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                15.9   100.0     0.0    26.8    26.8    12.9    19.6  9999.0

***** SHIP #  41 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 5.0    41.0     2.0   183.0   290.0   307.0    45.5    16.1     0.0     0.0   266.0    30.0    97.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                16.8    71.0     7.8  9999.0     5.0     1.0     1.0    31.0    -8.0     5.0  9999.0

     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                16.0     3.9    35.0     8.8     5.5  9999.0  9999.0
                16.2     5.1   -35.0     7.8     5.6  9999.0  9999.0

    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                16.8   100.0     0.0    36.8    36.8    10.1    15.7  9999.0

***** SHIP #  42 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 5.0    42.0     2.0   112.0   265.0   274.0    38.9    13.0     2.0     0.0   161.0    22.0    82.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                16.5    49.0     8.0  9999.0     1.0     1.0     1.0    22.0    -7.0     3.0  9999.0

     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                16.3     6.2    35.0     9.0     5.4  9999.0  9999.0
                16.5     5.7   -35.0     8.5     4.3  9999.0  9999.0

    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                16.2   100.0     0.0    26.5    26.5     9.7    13.0  9999.0

***** SHIP #  43 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 5.0    43.0     2.0   101.0   243.0   255.0    37.2    13.1     0.0     0.0   130.0    24.0   108.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
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                17.0    46.0     7.0  9999.0     5.0     1.0     1.0    31.0    -7.0     1.0  9999.0

     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                17.0     5.3    35.0     6.9     3.9  9999.0  9999.0
                17.0     5.4   -35.0     7.4     4.3  9999.0  9999.0

    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                16.4   100.0     0.0    24.6    24.6    10.0    12.5  9999.0

***** SHIP #  44 *****

   DIMENSION    HATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 5.0    44.0     3.0    36.0   213.0   223.0    31.7     3.3    17.0     0.0    98.0    15.0   122.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                16.4    36.0     6.0  9999.0     5.0     3.0     1.0    30.0    -6.0     6.0  9999.0

     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                16.4     5.3    35.0     7.0     3.6  9999.0  9999.0
                16.4     6.3   -35.0     6.7     3.5  9999.0  9999.0

    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                16.4   100.0     0.0    21.5    21.5     3.6     8.2  9999.0

***** SHIP #  45 *****

   DIMENSION    HATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 5.0    45.0     2.0   143.0   256.0   270.0    42.5    15.7     0.0     0.0   194.0    24.0   105.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                15.5    63.0     7.2     8.8     1.0     1.0     1.0    26.0    -7.0     5.0  9999.0

     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                15.5     4.2    35.0     8.2     4.6  9999.0  9999.0
                15.5     4.9   -35.0     8.0     4.6  9999.0  9999.0

    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                15.5   100.0     0.0    21.3    21.3    17.2    14.5  9999.0

***** SHIP #  46 *****

   DIMENSION    HATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 5.0    46.0     1.0    71.0   256.0   270.0    42.5     8.3    13.0     0.0   194.0    24.0   105.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                17.8    45.0     7.2     8.8     1.0     1.0     1.0    41.0    -6.0     2.0  9999.0

     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                17.8     5.2    35.0     8.0     4.4  9999.0  9999.0
                17.8     5.2   -35.0     7.9     4.7  9999.0  9999.0

    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                17.7   100.0     0.0    28.1    28.1     5.0    11.2  9999.0

***** SHIP #  47 *****

   DIMENSION    HATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 5.0    47.0     3.0    37.0   224.0   235.0    31.8     6.5    12.0     0.0   109.0    18.0   122.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                17.2    38.0     6.2  9999.0     1.0     3.0     1.0    30.0    -6.0     1.0  9999.0
     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               17.2    6.2   35.0    8.1    3.9 9999.0 9999.0
               17.2    6.3  -35.0    7.0    4.0 9999.0 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               17.0  100.0    0.0   16.3   16.3    2.0    5.3 9999.0

***** SHIP #  48 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                5.0   48.0    1.0   66.0  220.0  231.0   31.1   11.6    0.0    0.0   90.0   13.0  105.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               15.4   33.0    6.6    5.4    1.0    1.0    1.0   19.0   -6.0    1.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               15.2    5.2   35.0    6.5    3.3 9999.0 9999.0
               15.4    5.3  -35.0    7.3    3.8 9999.0 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               14.5  100.0    0.0   14.1   14.1   11.3    9.0 9999.0

***** SHIP #  49 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                5.0   49.0    2.0  244.0  310.0  325.0   47.2   18.9    0.0    0.0  304.0   28.0   85.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               15.9   75.0    8.8   13.4    5.0    1.0    1.0    2.2   -7.0    4.0    0.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               15.4    5.8   35.0   10.8    6.5 9999.0 9999.0
               15.4    5.8  -35.0   10.8    6.7 9999.0 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               15.9  100.0    0.0   44.7   44.7    6.9   22.5 9999.0

***** SHIP #  50 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                5.0   50.0    1.0   83.0  226.0  238.0   36.0   12.3    0.0    0.0  110.0   20.0  105.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               14.6   40.0    7.0    8.0    5.0    1.0    1.0    1.6   -9.0    2.0    0.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               14.6    5.4   35.0    6.2    3.8 9999.0 9999.0
               14.6    5.9  -35.0    7.0    4.0 9999.0 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               14.6  100.0    0.0   15.9   15.9   11.1   10.3 9999.0

***** SHIP #  51 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                5.0   51.0    2.0  370.0  330.0  345.0   53.3   24.0    0.0    0.0  480.0   37.0   93.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               14.0  159.0    7.2   12.8    1.0    1.0    4.0    3.5   -9.0    5.0    0.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               14.7 9999.0   37.0    8.4    4.0    9.8 9999.0
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                  14.7  9999.0   -37.0     9.4     4.7    10.4  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  14.8   100.0     0.0  9999.0    18.9    17.1    17.0  9999.0

       ZIG-ZAG    SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                  14.6    12.0     5.0    14.0  9999.0  9999.0  9999.0     8.7
                  14.6    11.0     6.0    16.0  9999.0  9999.0  9999.0     8.4
                  14.5    20.0    15.0    15.0  9999.0  9999.0  9999.0     8.5
                  14.6    20.0    15.0    14.0  9999.0  9999.0  9999.0     8.3


  ***** SHIP #  52 *****

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   3.0    52.0     2.0   113.0   254.0   265.0    39.9    13.3     0.0     0.0  9999.0  9999.0  9999.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  16.0    63.0     7.5     9.0     2.0     1.0     1.0     2.4    -8.0     3.0  9999.0

       TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  16.2  9999.0    35.0     7.7     3.2  9999.0  9999.0
                  16.2  9999.0   -35.0     7.9     3.2  9999.0  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  16.3   100.0     0.0  9999.0    30.5    14.9    12.6  9999.0


  ***** SHIP #  53 *****

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   3.0    53.0     1.0    89.0   237.0   244.0    36.6    12.5     5.0     0.0  9999.0  9999.0  9999.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  17.0    45.0     6.6     9.0     2.0     3.0     1.0     2.5    -9.0     3.0  9999.0

       TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  13.9  9999.0    35.0     9.9     4.3  9999.0  9999.0
                  13.9  9999.0   -35.0     9.2     4.5  9999.0  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  14.2   100.0     0.0  9999.0    20.4     5.9     8.0  9999.0


  ***** SHIP #  54 *****

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   8.0    54.0     2.0   111.0   250.0   263.0    38.1    14.3     0.0     0.5  9999.0    24.0   105.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  17.1    62.0     7.5    12.0     2.0     1.0     1.0     5.2   -10.0     2.0  9999.0

       TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  16.5  9999.0    35.0  9999.0  9999.0  9999.0  9999.0
                  16.5  9999.0   -35.0     7.8     4.6  9999.0  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  16.5   100.0     0.0  9999.0    33.4  9999.0    12.0  9999.0


  ***** SHIP #  55 *****

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   8.0    55.0     1.0    84.0   232.0   244.0    33.5    13.2     0.0     0.5  9999.0    17.0   110.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
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                 15.7   43.0    6.4   12.0    5.0    3.0    1.0    3.6   -8.0    2.0 9999.0

      TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 16.3 9999.0   35.0    7.2    3.5 9999.0 9999.0
                 16.3 9999.0  -35.0    7.2    3.5 9999.0 9999.0

     STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 16.3  100.0    0.0 9999.0   26.6 9999.0   11.5 9999.0

***** SHIP #  56 *****

    DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  8.0   56.0    2.0  104.0  257.0  273.0   38.7   15.3    0.0    0.5 9999.0   29.0  103.0

RUDDER, PROP     SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                 17.0   52.0    7.2   20.0    5.0    1.0    1.0    1.8  -12.0    1.0 9999.0

      TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 17.9 9999.0   35.0    8.2    4.4 9999.0 9999.0
                 17.9 9999.0  -35.0    8.8    4.6 9999.0 9999.0

     STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 17.8  100.0    0.0 9999.0   33.9    5.5   12.5 9999.0

***** SHIP #  57 *****

    DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  8.0   57.0    2.0  134.0  253.0  265.0   42.0   15.0    0.0    0.5 9999.0   18.0  119.0

RUDDER, PROP     SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                 14.5   61.0    6.7   16.0    5.0    3.0    1.0    2.0  -11.0    4.0 9999.0

      TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 13.6 9999.0   35.0    8.7    4.6 9999.0 9999.0
                 13.6 9999.0  -35.0    8.4    4.4 9999.0 9999.0

     STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 13.6  100.0    0.0 9999.0   25.8 9999.0   11.5 9999.0

***** SHIP #  58 *****

    DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  8.0   58.0    2.0  237.0  310.0  325.0   47.2   18.8    0.0    0.5 9999.0   28.0   85.0

RUDDER, PROP     SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                 16.0   79.0    8.8   14.0    5.0    1.0    1.0    2.2  -10.0    6.0 9999.0

      TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 15.5 9999.0   35.0   11.4    5.3 9999.0 9999.0
                 15.5 9999.0  -35.0   10.6    5.1 9999.0 9999.0

     STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 15.5  100.0    0.0 9999.0   35.9 9999.0   15.5 9999.0

***** SHIP #  59 *****

    DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  8.0   59.0    2.0   79.0  243.0  251.0   31.7   12.2    0.0    0.5 9999.0   21.0  114.0

RUDDER, PROP     SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                 15.8   44.0 9999.0 9999.0    2.0    3.0    1.0    2.0  -10.0    5.0 9999.0
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       TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  16.0 9999.0   35.0    6.6 9999.0 9999.0 9999.0
                  15.9 9999.0  -35.0    6.8 9999.0 9999.0 9999.0

      STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  15.9  100.0    0.0 9999.0   23.8 9999.0    8.8 9999.0

***** SHIP #  60 *****

     DIMENSION    MATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   8.0   60.0    1.0   64.0  206.0  226.0   31.7   13.0    0.0    0.5 9999.0   18.0  111.0

  RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                  15.0   35.0    6.7    9.8    2.0    1.0    1.0    9.0   -4.0    1.0 9999.0

       TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  16.5 9999.0   35.0    4.7    4.7 9999.0 9999.0
                9999.0 9999.0  -35.0    5.8    4.0 9999.0 9999.0

      STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  16.5  100.0    0.0 9999.0   33.4 9999.0   12.0 9999.0

***** SHIP #  61 *****

     DIMENSION    MATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   8.0   61.0    1.0   93.0  233.0  243.0   37.2   12.9    0.0    0.5 9999.0   24.0  108.0

  RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                  17.0   45.0    7.0   12.0    2.0    1.0    1.0   14.0   -5.0    1.0 9999.0

       TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  16.5 9999.0   35.0    6.9    3.9 9999.0 9999.0
                9999.0 9999.0  -35.0    7.4    4.3 9999.0 9999.0

      STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  16.3  100.0    0.0 9999.0   26.6 9999.0   11.5 9999.0

***** SHIP #  62 *****

     DIMENSION    MATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   8.0   62.0    2.0  220.0  305.0  324.0   47.2   18.4    0.0    0.5 9999.0   29.0   85.0

  RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                  16.2  109.0    8.9   14.0    2.0    1.0    1.0   21.0   -6.0    3.0 9999.0

       TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  16.0 9999.0   35.0   10.7    5.5 9999.0 9999.0
                9999.0 9999.0  -35.0   10.3    5.6 9999.0 9999.0

      STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  17.9  100.0    0.0 9999.0   33.0    5.5   12.5 9999.0

***** SHIP #  63 *****

     DIMENSION    MATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   8.0   63.0    1.0   69.0  226.0  236.0   32.2   11.6    0.0    0.5 9999.0   17.0  104.0

  RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                  16.0   45.0    6.6   17.0    5.0    2.0    1.0   16.0   -5.0    1.0 9999.0

       TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  16.0 9999.0   35.0    8.5 9999.0 9999.0 9999.0
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                 9999.0 9999.0  -35.0    9.4 9999.0 9999.0 9999.0

       STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                   13.6  100.0    0.0 9999.0   25.8 9999.0   11.5 9999.0

    ***** SHIP #  64 *****

      DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                    8.0   64.0    2.0  101.0  250.0  263.0   34.3   14.3    0.0    0.0 9999.0   26.0  108.0

   RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                   17.3   62.0    7.5   12.0    2.0    1.0    1.0   17.0   -5.0    7.0 9999.0

        TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                   16.0 9999.0   35.0    8.3    5.4 9999.0 9999.0
                 9999.0 9999.0  -35.0    9.2    5.7 9999.0 9999.0

       STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                   15.5  100.0    0.0 9999.0   35.9 9999.0   15.6 9999.0

    ***** SHIP #  65 *****

      DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                    8.0   65.0    1.0   62.0  215.0  227.0   31.1   11.4    0.0    0.0 9999.0   19.0  103.0

   RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                   17.0   44.0    7.0    8.0    2.0    1.0    1.0   14.0   -5.0    4.0 9999.0

        TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                   16.2 9999.0   35.0    9.0    3.7 9999.0 9999.0
                 9999.0 9999.0  -35.0    9.0    3.2 9999.0 9999.0

       STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                   15.9  100.0    0.0 9999.0   23.8 9999.0    8.7 9999.0

    ***** SHIP #  66 *****

      DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   14.0   66.0    3.0   66.0  220.0  231.0   30.0   12.1    0.0    0.0 9999.0   13.0  135.0

   RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                   14.0   31.0    5.7   12.6    3.0    3.0    1.0   13.0    0.0    2.0 9999.0

        TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                   14.0 9999.0   35.0 9999.0 9999.0 9999.0 9999.0
                   14.0 9999.0  -35.0 9999.0 9999.0 9999.0 9999.0

       STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                   14.0  100.0    0.0 9999.0 9999.0 9999.0   11.5 9999.0

    ***** SHIP #  67 *****

      DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   14.0   67.0    3.0   39.0  220.0  231.0   30.0    7.4    7.0    0.0 9999.0   13.0  135.0

   RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                   15.0   23.0    5.9   12.6    3.0    3.0    1.0   22.0    0.0    2.0 9999.0

        TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                   15.0 9999.0   35.0    9.0    4.9 9999.0 9999.0
                   15.0 9999.0  -35.0    8.6    4.7 9999.0 9999.0
    STOPPING     SPDS   SHPS    RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 14.0  100.0     0.0 9999.0 9999.0 9999.0    4.6 9999.0

$$$$$ SHIP #  68 $$$$$

   DIMENSION     NATN   NMBR    TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 14.0   68.0     3.0   76.0  222.0  237.0   32.0   12.9    0.0    0.5 9999.0   14.0  118.0

RUDDER, PROP     SSPD   RDAR    PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                 16.0   44.0     6.2   12.0    2.0    3.0    1.0   14.0    0.0    2.0 9999.0

     TURNING     SPDT   SPDF    RUDT   ADVT   TRNT   DIAT   FRPM
                 15.0    4.0    35.0    7.9    5.1 9999.0 9999.0
                 15.0 9999.0   -35.0    7.5    5.2 9999.0 9999.0

    STOPPING     SPDS   SHPS    RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 15.0  100.0     0.0 9999.0   11.1 9999.0   13.5 9999.0

$$$$$ SHIP #  69 $$$$$

   DIMENSION     NATN   NMBR    TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 14.0   69.0     3.0   39.0  222.0  237.0   32.0    7.2    3.0    0.5 9999.0   14.0  118.0

RUDDER, PROP     SSPD   RDAR    PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                 17.0   35.0     6.2   12.0    2.0    3.0    1.0   23.0    0.0    2.0 9999.0

     TURNING     SPDT   SPDF    RUDT   ADVT   TRNT   DIAT   FRPM
                 15.0    4.0    35.0    6.7    4.3 9999.0 9999.0
                 15.0 9999.0   -35.0    6.5    4.3 9999.0 9999.0

    STOPPING     SPDS   SHPS    RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 16.0  100.0     0.0 9999.0    5.6 9999.0    9.8 9999.0

$$$$$ SHIP #  70 $$$$$

   DIMENSION     NATN   NMBR    TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 14.0   70.0     1.0   65.0  214.0  224.0   32.0   11.9    1.0    0.0 9999.0   19.0  110.0

RUDDER, PROP     SSPD   RDAR    PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                 16.2   35.0     6.9 9999.0    2.0    1.0    1.0   10.0   -8.0    2.0 9999.0

     TURNING     SPDT   SPDF    RUDT   ADVT   TRNT   DIAT   FRPM
                 16.8 9999.0    35.0    5.9    5.2 9999.0 9999.0
                 16.8 9999.0   -35.0   11.8    4.9 9999.0 9999.0

    STOPPING     SPDS   SHPS    RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 16.8  100.0     0.0 9999.0   20.3 9999.0    7.7 9999.0

$$$$$ SHIP #  71 $$$$$

   DIMENSION     NATN   NMBR    TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 14.0   71.0     1.0   67.0  220.0  230.0   32.0   11.6    0.0    0.5 9999.0   16.0  100.0

RUDDER, PROP     SSPD   RDAR    PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                 16.3   38.0     7.1    8.2    2.0    1.0    1.0   16.0   -8.0    2.0 9999.0

     TURNING     SPDT   SPDF    RUDT   ADVT   TRNT   DIAT   FRPM
                 16.0 9999.0    35.0    6.3    7.2 9999.0 9999.0
                 16.0 9999.0   -35.0    7.4    6.9 9999.0 9999.0

    STOPPING     SPDS   SHPS    RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 16.0  100.0     0.0 9999.0   27.0 9999.0    9.0 9999.0
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***** SHIP #  72 *****

     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 14.0   72.0    1.0   48.0  220.0  230.0   32.0    8.7    5.0    0.5 9999.0   16.0  100.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 17.3   34.0    7.1    8.2    2.0    1.0    1.0   23.0   -7.0    2.0 9999.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 16.0 9999.0   35.0    4.8    5.4 9999.0 9999.0
                 16.0 9999.0  -35.0    8.2    5.4 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 16.0  100.0    0.0 9999.0 9999.0 9999.0    7.0 9999.0

***** SHIP #  73 *****

     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 14.0   73.0    3.0   97.0  240.0  252.0   35.0   13.7    0.0    0.0 9999.0   16.0  122.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 14.0   53.0    6.1   16.1    3.0    3.0    1.0   14.0    0.0    3.0 9999.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 10.0 9999.0   35.0    7.8    4.1 9999.0 9999.0
                 10.0 9999.0  -35.0   12.5    7.4 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 13.0  100.0    0.0 9999.0 9999.0 9999.0   13.0 9999.0

***** SHIP #  74 *****

     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 14.0   74.0    3.0   58.0  240.0  252.0   35.0    8.4   10.0    0.0 9999.0   16.0  122.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 15.0   40.0    6.1   16.1    3.0    3.0    1.0   21.0    0.0    3.0 9999.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 13.0 9999.0   35.0    9.9    4.2 9999.0 9999.0
                 13.0 9999.0  -35.0    7.2    3.7 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 13.0  100.0    0.0 9999.0 9999.0 9999.0    8.5 9999.0

***** SHIP #  75 *****

     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 14.0   75.0    3.0   76.0  222.0  237.0   32.0   12.9    1.0    0.5 9999.0 9999.0 9999.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 15.5   44.0    6.2   12.0    2.0    3.0    1.0   14.0    0.0    1.0 9999.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 17.0 9999.0   35.0    8.1    5.5 9999.0 9999.0
                 17.0 9999.0  -35.0    9.2    6.6 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 17.0  100.0    0.0 9999.0   41.0 9999.0   14.8 9999.0
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***** SHIP #  76 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
               14.0   76.0    3.0   39.0  222.0  237.0   32.0    7.2    2.0    0.5 9999.0 9999.0 9999.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               16.5 9999.0    6.2   12.0    2.0    3.0    1.0   23.0    0.0    1.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               17.0 9999.0   35.0    7.4    3.2 9999.0 9999.0
               17.0 9999.0  -35.0    7.5    3.7 9999.0 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               17.0  100.0    0.0 9999.0   28.0 9999.0   10.0 9999.0

***** SHIP #  77 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                9.0   77.0    1.0   63.0  228.0 9999.0   30.5   11.6 9999.0 9999.0   62.0   18.0 9999.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               16.6   34.0 9999.0    7.5    2.0    1.0    1.0   12.0  -10.0    3.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               16.6 9999.0   35.0    6.0    4.2 9999.0 9999.0
               16.6 9999.0  -35.0    7.0    4.6 9999.0 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               16.6  100.0    0.0 9999.0   22.7 9999.0 9999.0 9999.0

***** SHIP #  78 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                9.0   78.0    1.0   63.0  228.0 9999.0   31.0   11.9    0.0    0.9   64.0   20.0 9999.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               17.6   29.0 9999.0    9.4    5.0    1.0    1.0   14.0   -4.0    1.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               17.0 9999.0   35.0    6.1    4.3 9999.0 9999.0
               17.0 9999.0  -35.0    7.0    4.7 9999.0 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               17.5  100.0    0.0 9999.0   24.0    5.0 9999.0 9999.0

***** SHIP #  79 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                9.0   79.0    1.0   60.0  228.0 9999.0   31.1   11.0    1.0    0.9   60.0   18.0 9999.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               17.4   38.0 9999.0    7.3    3.0    1.0    1.0   13.0   -4.0    1.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               16.5 9999.0   35.0   11.0    9.3 9999.0 9999.0
               16.5 9999.0  -35.0   11.0    8.9 9999.0 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               17.0  100.0    0.0 9999.0   30.0 9999.0 9999.0 9999.0

***** SHIP #  80 *****
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     DIMENSION   NATH   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  9.0   80.0    1.0   58.0  228.0 9999.0   30.3   11.0    0.0    0.9   58.0   18.0 9999.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                 16.8   34.0 9999.0    7.5    2.0    1.0    1.0   14.0   -9.0    1.0 9999.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 16.8 9999.0   35.0   10.0    8.3 9999.0 9999.0
                 16.8 9999.0  -35.0   10.0    8.3 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 16.8  100.0    0.0 9999.0   22.2 9999.0 9999.0 9999.0


***** SHIP #  81 *****

     DIMENSION   NATH   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  9.0   81.0    1.0   58.0  230.0 9999.0   30.3   10.9    0.0    0.9   58.0   81.0 9999.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                 16.5   36.0 9999.0    7.5    2.0    1.0    1.0   14.0   -4.0    1.0 9999.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 16.5 9999.0   35.0    6.4    4.5 9999.0 9999.0
                 16.5 9999.0  -35.0    7.5    4.9 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 16.5  100.0    0.0 9999.0   21.1 9999.0 9999.0 9999.0


***** SHIP #  82 *****

     DIMENSION   NATH   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  9.0   82.0    1.0   67.0  231.0 9999.0   30.3   12.4    0.0    0.9   67.0   21.0 9999.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                 17.5   39.0 9999.0    7.3    2.0    1.0    1.0   16.0   -5.0    6.0 9999.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 16.0 9999.0   35.0    6.4    4.5 9999.0 9999.0
                 16.0 9999.0  -35.0    7.5    4.9 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 16.7  100.0    0.0 9999.0   21.1      5.8 9999.0 9999.0


***** SHIP #  83 *****

     DIMENSION   NATH   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  9.0   83.0    1.0   68.0  231.0 9999.0   30.3   12.9    0.0    0.5   35.0   21.0 9999.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                 17.4   40.0 9999.0   10.4    2.0    1.0    1.0   14.0   -9.0    2.0 9999.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 17.0 9999.0   35.0    6.0    4.1 9999.0 9999.0
                 17.0 9999.0  -35.0    6.6    4.7 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 17.0  100.0    0.0 9999.0   15.2 9999.0 9999.0 9999.0


***** SHIP #  84 *****

     DIMENSION   NATH   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  9.0   84.0    3.0   66.0  231.0 9999.0   30.3   12.3    0.0 9999.0   38.0   21.0 9999.0
  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                 17.9   38.0 9999.0   10.0    5.0    1.0    1.0   11.0   -4.0    2.0 9999.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 17.0 9999.0   35.0    6.5    4.6 9999.0 9999.0
                 17.0 9999.0  -35.0    6.6    4.8 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 17.3  100.0    0.0 9999.0   15.4 9999.0 9999.0 9999.0


  ***** SHIP #  85 *****

     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  9.0   85.0    3.0   66.0  235.0 9999.0   30.6   12.1    0.0 9999.0   41.0   19.0 9999.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                 16.5   70.0 9999.0   10.0    3.0    3.0    2.0   10.0   -5.0    4.0 9999.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 17.0 9999.0   35.0    6.7    4.9 9999.0 9999.0
                 17.0 9999.0  -35.0    6.8    5.1 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 16.1  100.0    0.0 9999.0   18.0 9999.0 9999.0 9999.0


  ***** SHIP #  86 *****

     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  9.0   86.0    3.0   66.0  235.0 9999.0   30.6   12.0    0.0 9999.0   41.0   21.0 9999.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                 17.9   70.0 9999.0   10.0    3.0    3.0    2.0   10.0   -5.0    6.0 9999.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 17.0 9999.0   35.0    6.6    4.7 9999.0 9999.0
                 17.0 9999.0  -35.0    6.7    4.9 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 17.0  100.0    0.0 9999.0   17.5 9999.0 9999.0 9999.0


  ***** SHIP #  87 *****

     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  9.0   87.0    3.0   67.0  236.0 9999.0   32.1   12.0    0.0 9999.0   50.0   21.0 9999.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                 17.8   38.0 9999.0   10.0    5.0    3.0    1.0   12.0   -5.0    3.0 9999.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 17.0 9999.0   35.0    6.9    4.9 9999.0 9999.0
                 17.0 9999.0  -35.0    6.4    4.7 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 17.2  100.0    0.0 9999.0   42.8 9999.0 9999.0 9999.0


  ***** SHIP #  88 *****

     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  9.0   88.0    3.0   67.0  240.0 9999.0   31.0   12.0    0.0 9999.0 9999.0   15.0 9999.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
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[redacted]

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                 15.0   34.0 9999.0    5.6    5.0    3.0    1.0   12.0   -5.0    3.0 9999.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 17.0 9999.0   35.0    6.8    4.8 9999.0 9999.0
                 17.0 9999.0  -35.0    6.5    4.7 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 17.1  100.0    0.0 9999.0   15.0 9999.0 9999.0 9999.0

 ***** SHIP #  89 *****

     DIMENSION   NATN   NNBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  9.0   89.0    3.0   40.0  240.0 9999.0   31.0   12.0    0.0 9999.0 9999.0   15.0 9999.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 15.0   34.0 9999.0    5.6    1.0    1.0    1.0   12.0   -5.0    2.0 9999.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 17.0 9999.0   35.0    7.1    4.3 9999.0 9999.0
                 17.0 9999.0  -35.0    6.9    4.1 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 16.0  100.0    0.0 9999.0   14.0 9999.0 9999.0 9999.0

 ***** SHIP #  90 *****

     DIMENSION   NATN   NNBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  9.0   90.0    3.0   40.0  240.0 9999.0   31.0   11.9    0.0 9999.0 9999.0   15.0 9999.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 15.0   34.0 9999.0    5.6    1.0    3.0    1.0   12.0   -5.0    2.0 9999.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 17.0 9999.0   35.0    7.1    4.9 9999.0 9999.0
                 17.0 9999.0  -35.0    7.0    4.8 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 16.0  100.0    0.0 9999.0   14.0 9999.0 9999.0 9999.0

 ***** SHIP #  91 *****

     DIMENSION   NATN   NNBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  9.0   91.0    3.0   40.0  240.0 9999.0   31.0   11.9    0.0 9999.0 9999.0   15.0 9999.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 16.0   34.0 9999.0    5.6    1.0    3.0    1.0   12.0   -5.0    2.0 9999.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 17.0 9999.0   35.0    7.0    5.0 9999.0 9999.0
                 17.0 9999.0  -35.0    6.9    4.8 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 16.0  100.0    0.0 9999.0   14.0 9999.0 9999.0 9999.0

 ***** SHIP #  92 *****

     DIMENSION   NATN   NNBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  9.0   92.0    3.0   40.0  240.0 9999.0   31.0   11.9    0.0 9999.0 9999.0   15.0 9999.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 16.0   34.0 9999.0    5.6    1.0    1.0    1.0   12.0   -5.0    2.0 9999.0
      TURNING     SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  17.0  9999.0    35.0     6.9     5.0  9999.0  9999.0
                  17.0  9999.0   -35.0     6.8     4.9  9999.0  9999.0

     STOPPING     SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  16.0   100.0     0.0  9999.0    14.0  9999.0  9999.0  9999.0

 $$$$$ SHIP #  93 $$$$$

    DIMENSION     NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   9.0    93.0     3.0    40.0   244.0  9999.0    35.1    12.3     6.0  9999.0    84.0    16.0  9999.0

 RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                  16.0    46.0  9999.0     7.1     1.0     1.0     1.0    14.0   -12.0     3.0  9999.0

      TURNING     SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  17.0  9999.0    35.0     7.6     3.7  9999.0  9999.0
                  17.0  9999.0   -35.0     6.8     3.3  9999.0  9999.0

     STOPPING .   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  16.0   100.0     0.0  9999.0    32.3  9999.0  9999.0  9999.0

 $$$$$ SHIP #  94 $$$$$

    DIMENSION     NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   9.0    94.0     3.0    45.0   244.0  9999.0    31.7    11.9     0.0  9999.0    71.0    21.0  9999.0

 RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                  16.0    45.0  9999.0    10.0     2.0     3.0     1.0    12.0   -12.0     4.0  9999.0

      TURNING     SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  15.0  9999.0    35.0     6.7     5.0  9999.0  9999.0
                  15.0  9999.0   -35.0     7.2     5.2  9999.0  9999.0

     STOPPING     SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  15.0   100.0     0.0  9999.0    20.1  9999.0  9999.0  9999.0

 $$$$$ SHIP #  95 $$$$$

    DIMENSION     NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   9.0    95.0     3.0    55.0   244.0  9999.0    35.0    12.5     0.0  9999.0    83.0    23.0  9999.0

 RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                  17.4    45.0  9999.0    11.0     1.0     3.0     1.0    16.0   -14.0     3.0  9999.0

      TURNING     SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  14.0  9999.0    35.0     6.7     4.6  9999.0  9999.0
                  14.0  9999.0   -35.0     7.7     4.6  9999.0  9999.0

     STOPPING     SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  14.0   100.0     0.0  9999.0    12.5     8.3  9999.0  9999.0

 $$$$$ SHIP #  96 $$$$$

    DIMENSION     NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   9.0    96.0     3.0    83.0   244.0  9999.0    35.0    12.5     0.0  9999.0    83.0    23.0  9999.0

 RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                  16.7    45.0  9999.0    10.0     5.0     1.0     1.0    16.5   -12.0     7.0  9999.0

      TURNING     SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  14.0  9999.0    35.0     6.1     4.5  9999.0  9999.0
```

[redacted]

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                  14.0 9999.0  -35.0    6.6    4.7 9999.0 9999.0

      STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  15.0 9999.0 9999.0 9999.0   24.5   10.7 9999.0 9999.0

  ***** SHIP #  97 *****

     DIMENSION    MATN   MMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   9.0   97.0    3.0   83.0  244.0 9999.0   35.0   12.5    0.0 9999.0   83.0   23.0 9999.0
  RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                  17.1   45.0 9999.0   10.0    5.0    1.0    1.0   16.5  -12.0    2.0 9999.0
       TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  14.0 9999.0   35.0    6.6    4.7 9999.0 9999.0
                  14.0 9999.0  -35.0    6.6    4.7 9999.0 9999.0

      STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  15.0 9999.0 9999.0 9999.0   24.0   11.0 9999.0 9999.0

  ***** SHIP #  98 *****

     DIMENSION    MATN   MMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   9.0   98.0    3.0   89.0  234.0 9999.0   35.0   13.0    0.0 9999.0   89.0   21.0 9999.0
  RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                  17.2   45.0 9999.0   10.0    5.0    1.0    1.0   16.5   -5.0    1.0 9999.0
       TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  17.4 9999.0   35.0    7.0    4.4 9999.0 9999.0
                  17.1 9999.0  -35.0    7.6    4.8 9999.0 9999.0

      STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  16.7 9999.0 9999.0 9999.0   17.1 9999.0 9999.0 9999.0

  ***** SHIP #  99 *****

     DIMENSION    MATN   MMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   9.0   99.0    3.0   99.0  259.0 9999.0   34.8   13.0    0.0 9999.0 9999.0   24.0 9999.0
  RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                  16.5   47.0 9999.0   10.0    1.0    1.0    1.0   16.5   -5.0    3.0 9999.0
       TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  15.8 9999.0   35.0    8.2    5.6 9999.0 9999.0
                  15.8 9999.0  -35.0    8.3    6.1 9999.0 9799.0

      STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  16.5 9999.0 9999.0 9999.0   37.0 9999.0 9999.0 9999.0

  ***** SHIP # 100 *****

     DIMENSION    MATN   MMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   1.0  100.0    3.0   75.0  302.0  305.0   32.0    8.4    0.0    0.0   76.0   14.0  120.0
  RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                  13.0   45.0    5.2 9999.0    1.0    4.0    4.0   20.3 9999.0    4.0    2.0
       TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  13.0 9999.0  -35.0    6.3    2.4    5.4 9999.0
                  13.0 9999.0   35.0    6.7    2.5    5.4 9999.0
                9999.0 9999.0   35.0    6.2    2.1    4.9 9999.0
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  STOPPING     SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
               13.0   100.0     0.0  9999.0     9.6  9999.0     6.3  9999.0

  ZIG-ZAG      SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
               13.0    20.0    14.0    13.0  9999.0  9999.0  9999.0     7.3
             9999.0    20.0     9.0    12.0  9999.0  9999.0  9999.0     9.4

***** SHIP # 101 *****

  DIMENSION    MATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                1.0   101.0     1.0    80.0   232.0  9999.0    30.1    12.2  9999.0     2.0  9999.0  9999.0  9999.0

  RUDDER, PROP SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WWWV    TRLC
             9999.0  9999.0  9999.0  9999.0     1.0  9999.0     1.0  9999.0  9999.0  9999.0     4.0

  TURNING      SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
             9999.0  9999.0   -35.0     7.4     3.9     4.7  9999.0

***** SHIP # 102 *****

  DIMENSION    MATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                1.0   102.0     2.0   250.0   331.0  9999.0    51.8    26.0  9999.0     2.0  9999.0  9999.0  9999.0

  RUDDER, PROP SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WWWV    TRLC
             9999.0  9999.0  9999.0  9999.0     2.0  9999.0     1.0  9999.0  9999.0  9999.0     4.0

  TURNING      SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
             9999.0  9999.0   -35.0  9999.0  9999.0  9999.0  9999.0

***** SHIP # 103 *****

  DIMENSION    MATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                1.0   103.0     2.0   280.0   323.0  9999.0    53.0    22.0  9999.0     1.0  9999.0  9999.0  9999.0

  RUDDER, PROP SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WWWV    TRLC
             9999.0  9999.0  9999.0  9999.0     5.0  9999.0     1.0  9999.0  9999.0  9999.0     4.0

  TURNING      SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
             9999.0  9999.0   -35.0    10.5     4.7     9.2  9999.0

***** SHIP # 104 *****

  DIMENSION    MATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                1.0   104.0     2.0   310.0   330.0  9999.0    53.4    24.0  9999.0     0.3  9999.0  9999.0  9999.0

  RUDDER, PROP SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WWWV    TRLC
             9999.0  9999.0  9999.0  9999.0  9999.0  9999.0     4.0  9999.0  9999.0  9999.0     4.0

  TURNING      SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
             9999.0  9999.0   -35.0  9999.0  9999.0  9999.0  9999.0

***** SHIP # 105 *****

  DIMENSION    MATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                1.0   105.0     2.0   400.0   350.0  9999.0    70.1    32.2  9999.0     6.0  9999.0  9999.0  9999.0

  RUDDER, PROP SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WWWV    TRLC
             9999.0  9999.0  9999.0  9999.0     1.0  9999.0     1.0  9999.0  9999.0  9999.0     4.0

  TURNING      SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
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                9999.0 9999.0  -35.0    9.3    3.8    7.9 9999.0

  ***** SHIP # 106 *****

       DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                     1.0   106.0     6.0  9999.0   248.0  9999.0    32.0     9.2  9999.0     0.9  9999.0  9999.0  9999.0

    RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                  9999.0  9999.0  9999.0  9999.0     2.0  9999.0     1.0  9999.0  9999.0  9999.0     4.0

         TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  9999.0  9999.0   -35.0  9999.0  9999.0  9999.0  9999.0

  ***** SHIP # 107 *****

       DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                     1.0   107.0     2.0    80.0   232.0  9999.0    38.1    12.2  9999.0     1.0  9999.0  9999.0  9999.0

    RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                  9999.0  9999.0  9999.0  9999.0     1.0  9999.0     1.0  9999.0  9999.0  9999.0     2.0

         TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  9999.0  9999.0   -35.0     7.0     3.5     6.7  9999.0

  ***** SHIP # 108 *****

       DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                     1.0   108.0     1.0  9999.0   232.0  9999.0    38.1  9999.0  9999.0     2.0  9999.0  9999.0  9999.0

    RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                  9999.0  9999.0  9999.0  9999.0     5.0  9999.0     1.0  9999.0  9999.0  9999.0     4.0

         TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  9999.0  9999.0   -35.0     6.5     3.9     7.3  9999.0

  ***** SHIP # 109 *****

       DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                     1.0   109.0     2.0   280.0   325.0  9999.0    53.0    22.0  9999.0     1.0  9999.0  9999.0  9999.0

    RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                  9999.0  9999.0  9999.0  9999.0     5.0  9999.0     1.0  9999.0  9999.0  9999.0     2.0

         TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  9999.0  9999.0   -35.0    10.6     4.7     9.2  9999.0

  ***** SHIP # 110 *****

       DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                     1.0   110.0     2.0   400.0   330.0  9999.0    70.1    22.2  9999.0     0.0  9999.0  9999.0  9999.0

    RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                  9999.0  9999.0  9999.0  9999.0     1.0  9999.0     1.0  9999.0  9999.0  9999.0     3.0

         TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  9999.0  9999.0   -35.0     9.4     4.2     7.7  9999.0

  ***** SHIP # 111 *****

       DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
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                 1.0  111.0    9.0    1.0   40.0   43.0   11.4    3.7    0.0    0.0    1.0    2.5  200.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   EHGN   PROP   LATA   LCAX   WNWV   TRLC
                 12.0 9999.0    2.6 9999.0 9999.0    3.0    1.0    1.4    0.0    1.0    3.0

      TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  5.0    4.4  -10.0    2.7    1.7    3.8 9999.0
                  5.5    3.6  -20.0    1.5    1.1    2.2 9999.0
                  5.5    2.9  -30.0    1.1    0.7    1.6 9999.0
                  5.0    4.3   10.0    2.2    1.7    3.5 9999.0
                  5.0    3.4   20.0    1.5    0.9    1.9 9999.0
                  5.3    2.9   28.0    1.2    0.6    1.5 9999.0
                  9.9    9.2   10.0    2.5    1.9    3.9 9999.0
                  9.9    7.6  -20.0    1.5    0.9    2.1 9999.0
                  9.9    6.3  -30.0    1.4    0.7    1.6 9999.0
                 10.0    9.2  -10.0    2.4    1.7    3.6 9999.0
                 10.0    7.5   20.0    1.6    0.9    2.1 9999.0
                  9.9    6.1   30.0    1.4    0.6    1.5 9999.0
                 14.6   14.3  -10.0    2.5    1.7    3.8 9999.0
                 14.8   12.8  -20.0    1.6    0.9    2.2 9999.0
                 14.7   11.3  -30.0    1.4    0.7    1.6 9999.0
                 14.6   14.2   10.0    2.6    1.9    3.9 9999.0
                 14.7   12.7   19.0    1.5    0.9    2.1 9999.0
                 14.8   10.6   28.0    1.3    0.8    1.5 9999.0

     STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  5.0  100.0    0.0    0.4 9999.0 9999.0    0.3 9999.0
                  7.8  100.0    0.0    0.7 9999.0 9999.0    0.4 9999.0
                 10.0  100.0    0.0    1.0 9999.0 9999.0    0.5 9999.0
                 12.8  100.0    0.0    1.6 9999.0 9999.0    0.7 9999.0
                 14.8  100.0    0.0    1.9 9999.0 9999.0    0.7 9999.0
                 14.7  100.0    0.0    2.1 9999.0 9999.0    0.8 9999.0

***** SHIP # 112 *****

     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  5.0  112.0    2.0  472.0  360.0 9999.0   69.2   23.1    0.0    1.0  475.0 9999.0 9999.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   EHGN   PROP   LATA   LCAX   WNWV   TRLC
               9999.0  166.0   10.5 9999.0    5.0 9999.0    1.0 9999.0 9999.0    1.0    5.0

       ZIG-ZAG   SPDZ   RUDZ   OVS1   OVSF   OVSW   KPRM   TPRM   PERD
               9999.0   20.0   12.0   15.0 9999.0 9999.0 9999.0    9.0

***** SHIP # 113 *****

     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  5.0  113.0    2.0  472.0  360.0 9999.0   69.2   23.1    0.0    1.0  475.0 9999.0 9999.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               9999.0  166.0   10.5 9999.0    5.0 9999.0    1.0 9999.0 9999.0    1.0    3.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               9999.0 9999.0   35.0   10.2    5.0    9.8 9999.0
               9999.0 9999.0  -35.0   10.5    5.0   11.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 16.3  100.0    0.0   50.3   29.7   23.8   22.8   50.0

       ZIG-ZAG   SPDZ   RUDZ   OVS1   OVSF   OVSW   KPRM   TPRM   PERD
               9999.0   20.0   14.0   16.0    0.0 9999.0 9999.0    9.0

***** SHIP # 114 *****
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    DIMENSION     NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0   114.0     2.0   472.0   360.0  9999.0    69.2    23.1     0.0     1.0   475.0  9999.0  9999.0

 RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                9999.0   166.0    10.5  9999.0     5.0  9999.0     1.0  9999.0  9999.0     1.0     4.0

      TURNING     SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                9999.0  9999.0    35.0    11.5     5.2    10.5  9999.0
                9999.0  9999.0   -35.0    11.3     5.5    11.0  9999.0

     STOPPING     SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  16.3   100.0     0.0    49.4    34.3    16.0    20.4  9999.0

 ***** SHIP # 115 *****

    DIMENSION     NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0   115.0     2.0   241.0   313.0  9999.0    48.2    19.2     0.0     1.0   243.0  9999.0  9999.0

 RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                9999.0    97.0     9.2  9999.0     5.0  9999.0     1.0  9999.0  9999.0     1.0     5.0

      ZIG-ZAG     SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                9999.0    20.0    12.0    19.0  9999.0  9999.0  9999.0    11.5
                9999.0    10.0     5.0    15.0  9999.0  9999.0  9999.0    11.0

 ***** SHIP # 116 *****

    DIMENSION     NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0   116.0     2.0   241.0   313.0  9999.0    48.2    19.2     0.0     1.0   243.0  9999.0  9999.0

 RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                9999.0    97.0     9.2  9999.0     5.0  9999.0     1.0  9999.0  9999.0     1.0     3.0

     STOPPING     SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  15.4   100.0     0.0    47.0    23.3    22.2    20.2   120.0

      ZIG-ZAG     SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                9999.0    20.0    16.0    18.0  9999.0  9999.0  9999.0     9.5
                9999.0    10.0     8.0    15.0  9999.0  9999.0  9999.0    10.0

 ***** SHIP # 117 *****

    DIMENSION     NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0   117.0     2.0   241.0   313.0  9999.0    48.2    19.2     0.0     1.0   243.0  9999.0  9999.0

 RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                9999.0    97.0     9.2  9999.0     5.0  9999.0     1.0  9999.0  9999.0     1.0     4.0

     STOPPING     SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  15.4   100.0     0.0    52.3    36.6    20.9    23.3  9999.0

 ***** SHIP # 118 *****

    DIMENSION     NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0   118.0     2.0   256.0   305.0  9999.0    52.6    19.5     0.0     1.0   258.0  9999.0  9999.0

 RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                9999.0    99.0     8.0  9999.0     5.0  9999.0     1.0  9999.0  9999.0     1.0     3.0

      TURNING     SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                9999.0  9999.0   -35.0    10.0     5.5     9.5  9999.0
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        ZIG-ZAG    SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                   15.6    20.0    15.0    14.0  9999.0     0.9     1.5     8.0

***** SHIP # 119 *****
      DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                    5.0   119.0     2.0   256.0   305.0  9999.0    52.6    19.5     0.0     1.0   258.0  9999.0  9999.0

  RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                 9999.0    99.0     8.0  9999.0     5.0 [illegible]999.0     1.0  9999.0  9999.0     1.0     4.0

        TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 9999.0  9999.0   -35.0    10.6     6.[illegible]    10.0  9999.0


***** SHIP # 120 *****
      DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                    5.0   120.0     2.0   463.0   350.0  9999.0    70.0    22.2     0.0  9999.0   463.0  9999.0  9999.0

  RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                   15.6   185.0     9.7  9999.0  9999.0  9999.0     1.0  9999.0  9999.0     1.0     3.0


***** SHIP # 121 *****
      DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                    1.0   121.0     7.0  9999.0  9999.0  9999.0  9999.0    11.0     0.0  9999.0  9999.0  9999.0  9999.0

  RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                 9999.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0     4.0     2.0

        TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 9999.0  9999.0    35.0     7.1     2.5     6.5    82.0

        ZIG-ZAG    SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                 9999.0    20.0    28.0    21.0  9999.0  9999.0  9999.0     6.0
                 9999.0    22.0    20.0    14.0  9999.0  9999.0  9999.0    10.2


***** SHIP # 122 *****
      DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                    1.0   122.0     1.0    87.0   250.0   262.0    31.7    13.3     0.0     0.0    87.0    21.0   112.0

  RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                 9999.0    47.0     7.0  9999.0     2.0     1.0     1.0    14.7  9999.0  9999.0     2.0

        TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 9999.0  9999.0    35.0     7.3     4.8     8.9  9999.0
                 9999.0  9999.0   -35.0     7.3     4.9     8.8  9999.0

       STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIHS    TIHR
                    8.9   100.0     0.0    14.5    13.6     3.0     9.1  9999.0
                   16.8   100.0     0.0    24.3    16.7    11.2    10.5  9999.0

        ZIG-ZAG    SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                 9999.0    10.0    12.0     9.0  9999.0  9999.0  9999.0  9999.0


***** SHIP # 123 *****
      DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                    1.0   123.0     2.0   137.0   272.0   287.0    40.2    15.0     0.0     0.0   137.0    39.0   112.0
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RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
              9999.0    94.0     6.7  9999.0     2.0     1.0     4.0    16.7  9999.0  9999.0     2.0

     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
              9999.0  9999.0   -35.0     7.4     4.0     7.2  9999.0
              9999.0  9999.0    35.0     7.3     4.2     7.8  9999.0

    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                19.0   100.0     0.0    22.1    18.6     7.5     9.0  9999.0
                10.9   100.0     0.0    13.6    13.4     1.4     8.0  9999.0

     ZIG-ZAG    SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
              9999.0    20.0    10.0    10.0     1.5  9999.0  9999.0  9999.0
              9999.0     8.0     8.0     8.0     2.2  9999.0  9999.0  9999.0

***** SHIP # 124 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 1.0   124.0     5.0    13.0   155.0   166.0    24.1     6.4    33.0     0.0    20.0    18.0   115.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
              9999.0    22.0     6.6  9999.0     2.0     1.0     1.0    16.4  9999.0  9999.0     2.0

     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
              9999.0  9999.0   -35.0     6.6     3.6     8.2  9999.0
              9999.0  9999.0    35.0     6.3     4.9     8.2  9999.0
              9999.0  9999.0   -35.0     6.7     3.1     7.7  9999.0
              9999.0  9999.0    35.0     5.6     3.4     7.6  9999.0
              9999.0  9999.0   -35.0     6.1     3.4     7.4  9999.0
              9999.0  9999.0    35.0     6.0     3.2     8.5  9999.0

    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
              9999.0   100.0     0.0    10.3     9.8     1.1     3.1  9999.0

     ZIG-ZAG    SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
              9999.0    20.0     5.0    12.0     5.8  9999.0  9999.0     2.4
              9999.0    20.0     6.0    14.0     7.4  9999.0  9999.0     2.6
              9999.0    20.0    12.0     9.0     7.1  9999.0  9999.0     2.4

***** SHIP # 125 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 1.0   125.0     2.0   189.0   263.0   276.0    52.7    17.5     0.0     0.1   189.0    27.0    85.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                15.0    94.0     8.6  9999.0     2.0     1.0     1.0    19.0     0.0     1.0     2.0

     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                15.3     6.9   -37.0     7.7     3.0     6.3  9999.0
                 7.2     3.1   -37.0     7.7     3.2     6.6  9999.0

    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                15.3   100.0     0.0    27.4  9999.0  9999.0    15.3  9999.0
                10.8   100.0     0.0    16.1  9999.0  9999.0    11.9  9999.0
                 7.2   100.0     0.0     8.0  9999.0  9999.0     8.3  9999.0
                 3.6   100.0     0.0     3.2  9999.0  9999.0     5.9  9999.0

***** SHIP # 126 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 1.0   126.0     2.0    53.0   263.0   276.0    52.7    10.1     9.0     0.1   189.0    27.0    85.0
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  RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                  16.8   94.0    8.6 9999.0    2.0    1.0    1.0   39.0    0.0    1.0    2.0

       TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  17.3    7.7  -37.0    8.2    3.5    7.2 9999.0
                   8.1    5.7  -37.0    8.0    3.4    7.1 9999.0

      STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  17.3  100.0    0.0   19.3 9999.0 9999.0   10.2 9999.0
                  12.2  100.0    0.0   12.9 9999.0 9999.0    8.5 9999.0
                   8.1  100.0    0.0    6.4 9999.0 9999.0    5.8 9999.0
                   4.1  100.0    0.0    1.6 9999.0 9999.0    3.3 9999.0


 ***** SHIP # 127 *****

     DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   1.0  127.0    1.0   47.0  201.0  210.0   27.4   10.6    0.0    0.1   47.0   15.0   90.0

  RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                9999.0   33.0    6.7 9999.0    2.0    1.0    1.0    9.6    0.0    1.0    2.0

       TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  12.7 9999.0  -35.0    4.6    3.1    6.5 9999.0
                  16.2 9999.0   35.0    6.3    3.2    7.3 9999.0

      STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  16.8  100.0    0.0   22.9   18.6    3.0    8.2   38.0

       ZIG-ZAG    SPDZ   RUDZ   OVS1   OVSF   OVSW   KPRM   TPRM   PERD
                  11.9   20.0    9.0    8.0    0.0 9999.0 9999.0    3.9


 ***** SHIP # 128 *****

     DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   1.0  128.0    1.0  107.0  261.0  273.0   32.2   14.7    0.0    0.1  106.0   24.0   90.0

  RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                9999.0   58.0    7.9 9999.0    2.0    1.0    1.0   23.4    0.0    1.0    2.0

       TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                9999.0 9999.0   35.0    8.1    4.8    9.5 9999.0
                9999.0 9999.0  -35.0    7.8    4.0    9.5 9999.0

      STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                9999.0  100.0    0.0   29.3   27.4   10.7   13.0   21.0

       ZIG-ZAG    SPDZ   RUDZ   OVS1   OVSF   OVSW   KPRM   TPRM   PERD
                9999.0   20.0   10.0    9.0    0.0 9999.0 9999.0    4.9


 ***** SHIP # 129 *****

     DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   1.0  129.0    2.0  217.0  279.0  290.0   50.6   18.1    0.0    0.0  217.0   28.0   90.0

  RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                  14.5   81.0    8.4 9999.0    2.0    1.0    1.0   24.1    0.0    1.0    2.0

       TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  15.5 9999.0  -35.0    9.3    4.1   10.2 9999.0
                  15.5 9999.0   35.0    8.0    3.8    9.2 9999.0
                  15.5 9999.0  -20.0   11.8    5.6   14.0 9999.0
                  15.5 9999.0   20.0   10.4    5.6   13.0 9999.0
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    STOPPING      SPDS    SHPS     RUDS     TDIS     HRCH     SRCH     TIMS    TIMR
                  15.5   100.0      0.0     41.1     29.3     16.5     17.6  9999.0
                   9.4  9999.0      0.0     24.4     21.0      5.3     15.0  9999.0
                   9.4  9999.0      0.0     54.9     39.5     29.0     45.0  9999.0
                   9.4  9999.0      0.0     72.2     69.3     12.2     69.0  9999.0
                   3.9  9999.0      0.0      6.1      5.3      1.2      8.4  9999.0
                   4.2  9999.0      0.0     22.8     20.4      2.7     31.0  9999.0
                   4.8  9999.0      0.0     56.4     53.5      6.7     82.2  9999.0

$$$$$ SHIP # 130 $$$$$

    DIMENSION     NATN    NMBR     TYPE     DISP     LBPX     LOAX     BEAM     DRFT     TRIM     BULB     DDIS     SSHP     SRPM
                   1.0   130.0      2.0     92.0    279.0    290.0     50.6      8.5     44.0      0.0    217.0     28.0     90.0
 RUDDER, PROP     SSPD    RDAR     PDIA     ASHP     RDST     ENGN     PROP     LATA     LCAX     WNWV     TRLC
                  15.6    81.0      8.4   9999.0      2.0      1.0      1.0     51.5   9999.0      1.0      2.0
      TURNING     SPDT    SPDF     RUDT     ADVT     TRNT     DIAT     FRPM
                  16.2  9999.0    -35.0      8.6      3.7      9.6   9999.0
                  16.2  9999.0     35.0      8.3      3.2      8.2   9999.0

$$$$$ SHIP # 131 $$$$$

    DIMENSION     NATN    NMBR     TYPE     DISP     LBPX     LOAX     BEAM     DRFT     TRIM     BULB     DDIS     SSHP     SRPM
                   1.0   131.0      3.0     37.0    244.0    242.0     32.3      6.0     59.0      0.7   9999.0     19.0    115.0
 RUDDER, PROP     SSPD    RDAR     PDIA     ASHP     RDST     ENGN     PROP     LATA     LCAX     WNWV     TRLC
                9999.0    45.0      6.4   9999.0      5.0      3.0      1.0     35.2    -19.0      1.0      2.0
      TURNING     SPDT    SPDF     RUDT     ADVT     TRNT     DIAT     FRPM
                  17.1  9999.0    -36.0      8.1      3.4      8.7     90.0
                  17.1  9999.0    -36.0      6.5      2.2      6.2     98.0
     STOPPING     SPDS    SHPS     RUDS     TDIS     HRCH     SRCH     TIMS     TIMR
                  18.2   100.0      0.0     22.6   9999.0   9999.0      7.5     31.0
                  18.2  9999.0      0.0     46.4   9999.0   9999.0     38.6    323.0

$$$$$ SHIP # 132 $$$$$

    DIMENSION     NATN    NMBR     TYPE     DISP     LBPX     LOAX     BEAM     DRFT     TRIM     BULB     DDIS     SSHP     SRPM
                   1.0   132.0      3.0     50.0    230.0    242.0     32.3     13.9      3.0      0.8     87.0     17.0    110.0
 RUDDER, PROP     SSPD    RDAR     PDIA     ASHP     RDST     ENGN     PROP     LATA     LCAX     WNWV     TRLC
                  16.2    50.0      6.4   9999.0      5.0      3.0      1.0     15.6    -11.0      1.0      2.0
      TURNING     SPDT    SPDF     RUDT     ADVT     TRNT     DIAT     FRPM
                  16.4  9999.0     36.0      7.8      3.6      8.2   9999.0
                  16.4  9999.0    -36.0      7.8      3.5      8.1   9999.0
     STOPPING     SPDS    SHPS     RUDS     TDIS     HRCH     SRCH     TIMS     TIMR
                  16.4   100.0      0.0     32.7   9999.0   9999.0     11.9     82.0

$$$$$ SHIP # 133 $$$$$

    DIMENSION     NATN    NMBR     TYPE     DISP     LBPX     LOAX     BEAM     DRFT     TRIM     BULB     DDIS     SSHP     SRPM
                   1.0   133.0      3.0     56.0    216.0    227.0     30.4     10.3      1.0      0.0     56.0     18.0    106.0
 RUDDER, PROP     SSPD    RDAR     PDIA     ASHP     RDST     ENGN     PROP     LATA     LCAX     WNWV     TRLC
                  17.3    32.0      6.7   9999.0      5.0      1.0      1.0     13.8    -13.0      1.0      2.0
      TURNING     SPDT    SPDF     RUDT     ADVT     TRNT     DIAT     FRPM
                  17.0  9999.0    -35.0      6.2      2.7      6.4     93.0
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                   16.9  9999.0    34.0     7.2     2.9     6.2    90.0

       STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                   17.5   100.0     0.0    28.7    18.9    14.3    11.3    60.0

***** SHIP # 134 *****

      DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                    1.0   134.0     3.0    65.0   220.0   232.0    31.1    11.6    -3.0     0.0    66.0    22.0   105.0

  RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                   17.5    35.0     7.0  9999.0     5.0     1.0     1.0    15.2   -12.0     4.0     2.0

        TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                   17.1  9999.0    35.0     7.0     3.4     7.6    87.0
                   17.1  9999.0   -35.0     7.7     3.3     7.2    88.0

       STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                   17.3   100.0     0.0    24.5  9999.0  9999.0     7.6    85.0

        ZIG-ZAG    SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                   17.2    20.0    14.0    15.0  9999.0  9999.0  9999.0     5.3

***** SHIP # 135 *****

      DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                    1.0   135.0  9999.0  9999.0   266.0  9999.0    32.0     9.9  9999.0  9999.0  9999.0  9999.0  9999.0

  RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                   19.2  9999.0  9999.0  9999.0  9999.0     1.0     1.0  9999.0  9999.0     1.0     1.0

        TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                   19.2  9997.0   -35.0     7.9     4.0     9.9  9999.0
                   19.2  9999.0    35.0     7.7     2.7     7.9  9999.0
                   10.4  9999.0   -35.0     7.7     3.9  9999.0  9999.0
                   10.4  9999.0    35.0     7.5     3.7  9999.0  9999.0

       STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                   19.2    60.0     0.0    13.8  9999.0  9999.0     5.0  9999.0
                   10.4    60.0     0.0     3.9  9999.0  9999.0     2.7  9999.0

***** SHIP # 136 *****

      DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                    1.0   136.0  9999.0  9999.0   266.0  9999.0    32.0     7.8  9999.0  9999.0  9999.0  9999.0  9999.0

  RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                 9999.0  9999.0  9999.0  9997.0  9999.0     1.0     1.0  9999.0  9999.0     1.0     1.0

        TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 9999.0  9999.0   -35.0     5.5     4.1  9999.0  9999.0
                 9999.0  9999.0    35.0     6.0     3.5  9999.0  9999.0
                 9999.0  9997.0   -35.0     5.0     6.2  9999.0  9999.0
                 9999.0  9999.0    35.0     5.8     2.8  9999.0  9999.0

       STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 9999.0    60.0     0.0     9.6  9999.0  9999.0     4.4  9999.0
                 9999.0    60.0     0.0     4.7  9999.0  9999.0     2.7  9999.0

***** SHIP # 137 *****

      DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
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                1.0  137.0    7.0   98.0  276.0 9999.0   41.2   11.0   12.0 9999.0   97.0 9999.0 9999.0
 RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
              9999.0   53.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0    1.0    1.0
      ZIG-ZAG   SPDZ   RUDZ   OVS1   OVSF   OVSW   KPRM   TPRM   PERD
                19.0   20.0   28.0   21.0 9999.0 9999.0 9999.0    6.0
                10.0   20.0   22.0   14.0 9999.0 9999.0 9999.0   10.2

 ***** SHIP # 138 *****

    DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                14.0  138.0    3.0   65.0  214.0  229.0   28.5   12.6    0.0 9999.0   65.0   13.8  118.0
 RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                15.4   40.0    6.1   13.8    2.0    3.0    1.0   15.9    0.0    1.0 9999.0
      TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                14.8 9999.0   35.0    7.4    4.8    8.3 9999.0
                14.8 9999.0  -35.0    5.0    3.7    7.0 9999.0

 ***** SHIP # 139 *****

    DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                14.0  139.0    3.0   29.0  214.0  229.0   28.5    5.7   34.0 9999.0   65.0   13.8  118.0
 RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                17.5   40.0    6.1   13.8    2.0    3.0    1.0   30.5    0.0    1.0 9999.0
      TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                17.5 9999.0   35.0    5.0    3.7    7.0 9999.0
                17.5 9999.0  -35.0    4.4    3.5    5.9 9999.0
     STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                17.6  100.0    0.0 9999.0 9999.0 9999.0    7.6 9999.0

 ***** SHIP # 140 *****

    DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 1.0  140.0    2.0  189.0  243.0  276.0   52.7   16.8    0.0    0.2 9999.0 9999.0 9999.0
 RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                15.0   94.0    8.6 9999.0    2.0    1.0    1.0   19.0 9999.0    3.0    2.0
      TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                15.0 9999.0   35.0    8.6    1.7    7.3   88.0
                15.0 9999.0  -35.0    8.1    2.1    7.6   88.0
                 6.6 9999.0   35.0    8.1    1.1    5.7  100.0
                 5.9 9999.0  -35.0    7.8    1.5    7.0  100.0
     STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                15.0  100.0    0.0 9999.0   27.4 9999.0   17.0    5.0
                15.0  100.0    0.0 9999.0   27.6 9999.0   14.5    8.0
                15.0  100.0    0.0 9999.0   19.5 9999.0   14.3   10.0
                 6.6   50.0    0.0 9999.0    6.1 9999.0    7.3    5.0
      ZIG-ZAG   SPDZ   RUDZ   OVS1   OVSF   OVSW   KPRM   TPRM   PERD
                15.0   20.0   25.0   20.0 9999.0 9999.0 9999.0 9999.0

 ***** SHIP # 141 *****

    DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
```

```
                    1.0  141.0    1.0   53.0  263.0  276.0   52.7    7.9   25.0    0.2 9999.0 9999.0 9999.0

    RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                   16.8   94.0    8.6 9999.0    2.0    1.0    1.0   39.0    0.0    3.0    2.0

         TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                   17.0 9999.0   35.0    8.6    1.8    7.5   89.0
                   17.0 9999.0  -35.0    9.0    2.3    8.8   91.0
                    7.0 9999.0   35.0    7.7    1.8    7.3  100.0
                    7.0 9999.0  -35.0    8.1    2.1    8.0  100.0

        STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                   17.0  100.0    0.0 9999.0   24.3 9999.0   11.7   10.0
                    8.2   50.0    0.0 9999.0   10.2 9999.0    5.8    5.0

***** SHIP # 142 *****

       DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                    1.0  142.0    3.0   13.0 9999.0 9999.0 9999.0    4.6   25.0    0.0   13.0   22.0  110.0

    RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0    3.0    2.0

         TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                   15.0 9999.0   35.0    5.0    2.9    9.1   91.0
                   15.0 9999.0  -35.0    6.1    3.6    8.8   91.0
                   15.0 9999.0  -35.0    5.7    3.1    8.2   94.0
                   15.0 9999.0   35.0    5.4    3.2    6.9   88.0
                   15.0 9999.0  -35.0    3.2    3.2    6.1   93.0
                   15.0 9999.0   35.0    2.9    4.4    6.7   93.0
                   15.0 9999.0  -35.0    3.1    3.7    5.1   93.0
                   15.0 9999.0  -35.0    5.3    4.3    9.2   88.0
                   15.0 9999.0   35.0    4.8    5.1    8.7   88.0

         ZIG-ZAG   SPDZ   RUDZ   OVS1   OVSF   OVSW   KPRM   TPRM   PERD
                   15.0   20.0    7.0   13.0 9999.0 9999.0 9999.0    2.3
                   15.0   20.0    9.0    9.0 9999.0 9999.0 9999.0    2.3
                   15.0   20.0    7.0    9.0 9999.0 9999.0 9999.0    2.2

***** SHIP # 143 *****

       DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                    1.0  143.0    2.0  189.0  263.0  276.0   52.7   16.8    0.0    0.2 9999.0 9999.0 9999.0

    RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                   15.0   94.0    8.6 9999.0    2.0    1.0    1.0   19.0    0.0    3.0    2.0

         TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                    7.1 9999.0   45.0    8.2    3.5    7.7   94.0
                    7.2 9999.0  -45.0    8.1    3.3    7.4   95.0
                    8.3 9999.0   35.0    8.2    3.4    9.7   89.0
                    8.2 9999.0  -35.0   10.3    4.6   10.6   96.0
                    9.0 9999.0  -35.0    9.1    4.1   12.0   91.0
                   13.8 9999.0   45.0    9.2    2.1    7.9   91.0
                   14.0 9999.0  -45.0    9.1    1.5    9.1   86.0
                   13.3    4.1   35.0    9.8    4.3   10.1  100.0
                   13.3    4.0  -35.0   10.4    4.5   10.9   94.0
                   15.1    4.8   35.0   10.1    3.9   10.0   85.0
                   15.2    5.0  -35.0   11.0    4.7   11.0   88.0
                   15.2    6.0  -35.0   10.8    4.8   10.8   91.0
                   14.6    5.0   35.0   10.6    3.9    9.6   95.0
                   15.0    6.0  -35.0   10.8    5.6   11.4   93.0
                   15.0    6.0   35.0   10.0    3.4    8.9   93.0
                   15.0    6.5  -35.0   10.1    3.7   10.6   91.0
       STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  16.0   100.0    35.0    30.0  9999.0  9999.0    15.0   120.0
                  16.0   100.0     0.0    34.0  9999.0  9999.0    19.0    90.0
                  16.0   100.0    35.0    40.0  9999.0  9999.0    18.0   100.0
                  16.0   100.0     0.0    32.0  9999.0  9999.0    20.0   110.0
                  16.0   100.0     0.0    56.1  9999.0  9999.0    19.0   105.0
                   6.5   100.0     0.0    37.0  9999.0  9999.0    17.0    70.0
                   5.0   100.0     0.0     7.6  9999.0  9999.0     9.0    60.0
                  15.8   100.0     0.0    37.5  9999.0  9999.0    20.0   150.0
                   8.5   100.0     0.0    45.2  9999.0  9999.0    19.0   110.0

        ZIG-ZAG   SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                  14.8    10.0     7.0    17.0  9999.0  9999.0  9999.0  9999.0

  ##### SHIP # 144 #####

      DIMENSION   NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   1.0   144.0     1.0    53.0   263.0   276.0    52.7     7.9    25.0     0.2  9999.0  9999.0  9999.0

   RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                  16.8    94.0     8.6  9999.0     2.0     1.0     1.0    39.0     0.0     3.0     2.0

        TURNING   SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  13.5     5.8    35.0     9.8     3.1     8.9    89.0
                  16.0     6.0   -35.0    10.9     2.9     9.5    92.0
                  15.0     5.1    35.0    10.8     3.3     9.6    90.0
                  15.0     5.8   -35.0    11.2     2.9     9.8    92.0
                  14.1     5.9    35.0    11.1     2.8     9.3    93.0
                  14.1     5.0   -35.0    10.4     2.7     8.1    91.0
                  14.2     5.0    35.0     9.8     2.0     6.9    88.0
                  10.5     4.5   -35.0     9.1     2.1     7.5    95.0

       STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  16.1   100.0     0.0    38.0  9999.0  9999.0    14.0    90.0
                  15.8   100.0     0.0    40.0  9999.0  9999.0    17.0   120.0
                  17.1   100.0     0.0    42.0  9999.0  9999.0    15.0   120.0
                  14.2   100.0     0.0    28.8  9999.0  9999.0    13.0    75.0

        ZIG-ZAG   SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                  12.8    20.0    20.0    20.0     4.1  9999.0  9999.0    10.0

  ##### SHIP # 145 #####

      DIMENSION   NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM  . BULB    DDIS    SSHP    SRPM
                   7.0   145.0     2.0   134.0   258.0  9999.0    39.0    15.4     3.0  9999.0   134.0    26.0   122.0

   RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                9999.0  9999.0     6.7  9999.0  9999.0     4.0     1.0    15.7     0.0  9999.0  9999.0

        TURNING   SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  15.5  9999.0    35.0     6.4  9999.0     6.7  9999.0
                  15.5  9999.0   -35.0     6.9  9999.0     6.6  9999.0

       STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  15.6   100.0     0.0  9999.0    20.1     7.3    10.0  9999.0

  ##### SHIP # 146 #####

      DIMENSION   NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   7.0   146.0     2.0   123.0   258.0  9999.0    39.0    14.2     1.0  9999.0   123.0    26.0   122.0

   RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
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[redacted]

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               9999.0 9999.0    6.7 9999.0 9999.0    4.0    1.0   18.8    0.0 9999.0 9999.0

       STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  15.2  100.0    0.0 9999.0   13.3    6.7    7.2 9999.0

  ***** SHIP # 147 *****

      DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  14.0  147.0    3.0   65.0  204.0 9999.0   30.8   12.3    0.0 9999.0   65.0   13.8  118.0

   RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                9999.0 9999.0    6.4   13.8 9999.0    3.0    1.0   11.3    0.0 9999.0 9999.0

        TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  16.0 9999.0   35.0    3.5 9999.0 9999.0 9999.0
                  16.0 9999.0  -35.0    3.5 9999.0 9999.0 9999.0

       STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  16.0  100.0    0.0 9999.0   20.0 9999.0    7.0 9999.0

  ***** SHIP # 148 *****

      DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  14.0  148.0    3.0   11.0  204.0 9999.0   30.8    2.4  135.0 9999.0   65.0   13.8  118.0

   RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                9999.0 9999.0    6.4   13.8 9999.0    3.0    1.0   31.5    0.0 9999.0 9999.0

        TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  16.0 9999.0   35.0    2.0 9999.0 9999.0 9999.0
                  16.0 9999.0  -35.0    2.0 9999.0 9999.0 9999.0

       STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  16.0  100.0    0.0 9999.0   14.2 9999.0    5.1 9999.0

  ***** SHIP # 149 *****

      DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  14.0  149.0    2.0  116.0  261.0 9999.0   38.9   13.4    0.0 9999.0  116.0   18.9  116.0

   RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                9999.0   49.0    6.7 9999.0 9999.0    3.0    1.0   16.1    0.0 9999.0 9999.0

        TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                9999.0 9999.0   35.0    7.0 9999.0 9999.0 9999.0
                9999.0 9999.0  -35.0    7.4 9999.0 9999.0 9999.0

       STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  14.2  100.0    0.0 9999.0 9999.0 9999.0   11.8 9999.0

  ***** SHIP # 150 *****

      DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   9.0  150.0    1.0   95.0  259.0 9999.0   35.5   13.1    0.0 9999.0 9999.0 9999.0 9999.0

   RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                  16.5   49.0 9999.0   10.0    1.0    1.0    1.0   16.5   -4.0    5.0 9999.0

        TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  14.8 9999.0   35.0    8.2    5.6 9999.0 9999.0
                  14.8 9999.0  -35.0    8.3    6.1 9999.0 9999.0
      STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 14.8  9999.0  9999.0  9999.0    23.0  9999.0  9999.0  9999.0

  ***** SHIP # 151 *****

     DIMENSION   NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  9.0   151.0     2.0   111.0   280.0  9999.0    37.1    13.2     0.0  9999.0   111.0    26.0  9999.0

  RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                 17.4    54.0  9999.0    10.0     3.0     1.0     1.0    17.0   -13.0     5.0  9999.0

       TURNING   SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 17.4  9999.0    35.0     7.8     5.1  9999.0  9999.0
                 17.4  9999.0   -35.0     7.9     5.2  9999.0  9999.0

      STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 17.4  9999.0  9999.0  9999.0    36.0  9999.0  9999.0  9999.0

  ***** SHIP # 152 *****

     DIMENSION   NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  9.0   152.0     2.0   109.0   250.0  9999.0    36.6    13.5     0.0  9999.0   109.0    18.0  9999.0

  RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                 15.0    54.0  9999.0    10.0     5.0     1.0     1.0    18.0   -14.0     7.0  9999.0

       TURNING   SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 14.0  9999.0    35.0     7.8     3.9  9999.0  9999.0
                 14.0  9999.0   -35.0     7.9     3.9  9999.0  9999.0

      STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 12.5  9999.0  9999.0  9999.0    17.6  9999.0  9999.0  9999.0

  ***** SHIP # 153 *****

     DIMENSION   NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  9.0   153.0     1.0    99.0   255.0  9999.0    31.6    13.5     0.0  9999.0  9999.0    18.0  9999.0

  RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                 15.0    54.0  9999.0    10.0     5.0     1.0     1.0    16.0   -13.0     4.0  9999.0

       TURNING   SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 15.8  9999.0    35.0     6.8     5.0  9999.0  9999.0
                 15.8  9999.0   -35.0     7.0     5.2  9999.0  9999.0

      STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 15.8  9999.0  9999.0  9999.0    19.9     6.3  9999.0  9999.0

  ***** SHIP # 154 *****

     DIMENSION   NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  9.0   154.0     1.0    99.0   255.0  9999.0    31.6    13.5     0.0  9999.0  9999.0    19.0  9999.0

  RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                 15.0    59.0  9999.0    10.0     5.0     1.0     1.0    16.0   -13.0     5.0  9999.0

       TURNING   SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 17.0  9999.0    35.0     6.7     5.2  9999.0  9999.0
                 17.0  9999.0   -35.0     6.9     5.5  9999.0  9999.0

      STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 18.4  9999.0  9999.0  9999.0    12.2  9999.0  9999.0  9999.0
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***** SHIP # 155 *****
     DIMENSION   NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    BDIS    SSHP    SRPM
                  9.0   155.0     1.0    66.0   237.0  9999.0    31.0    11.4     1.0  9999.0    66.0    15.0  9999.0

  RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WWWV    TRLC
                 15.0    36.0  9999.0    10.0     2.0     1.0     1.0    11.0   -12.0     3.0  9999.0

       TURNING   SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 16.0  9999.0    35.0     8.0     5.5  9999.0  9999.0
                 16.0  9999.0   -35.0     8.8     4.4  9999.0  9999.0

      STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 15.0  9999.0  9999.0  9999.0    24.0  9999.0  9999.0  9999.0

***** SHIP # 156 *****
     DIMENSION . NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    BDIS    SSHP    SRPM
                  9.0   156.0     1.0    66.0   237.0  9999.0    31.0    11.4     1.0  9999.0    66.0    15.0  9999.0

  RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WWWV    TRLC
                 15.2    36.0  9999.0    10.0     2.0     1.0     1.0    11.0   -11.0     4.0  9999.0

       TURNING   SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 15.5  9999.0    35.0     4.2     3.8  9999.0  9999.0
                 15.5  9999.0   -35.0     5.0     4.0  9999.0  9999.0

***** SHIP # 157 *****
     DIMENSION   NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    BDIS    SSHP    SRPM
                  9.0   157.0     2.0   112.0   243.0  9999.0    37.1    14.2     1.0  9999.0   112.0    22.0  9999.0

  RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WWWV    TRLC
                 16.3    54.0  9999.0    22.4     2.0     3.0     1.0    14.0   -11.0     5.0  9999.0

       TURNING   SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 16.0  9999.0    35.0    10.4     4.0  9999.0  9999.0
                 16.0  9999.0   -35.0     8.2     3.8  9999.0  9999.0

      STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 15.0  9999.0  9999.0  9999.0    32.0  9999.0  9999.0  9999.0

***** SHIP # 158 *****
     DIMENSION   NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    BDIS    SSHP    SRPM
                  1.0   158.0     3.0    16.0   177.0   185.0    25.0     5.3    20.0  9999.0    32.0    22.0   103.0

  RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WWWV    TRLC
                 20.0    31.0  9999.0    24.0     3.0     3.0     1.0    21.0    -5.0     3.0     2.0

       TURNING   SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 23.0  9999.0   -35.0     7.9     4.0     9.8  9999.0
                 23.0  9999.0    35.0     6.6     4.6    10.1  9999.0

      STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 23.0   100.0     0.0    13.0    12.9     1.0     4.1    40.0

       ZIG-ZAG   SPDZ    RUDZ    OVS1    OVSF    OVSH    KPRM    TPRM    PERD
                 23.0    20.0    10.0    10.0  9999.0  9999.0  9999.0     2.8
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[redacted]

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***** SHIP # 159 *****

      DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                    1.0   159.0     3.0    17.0   173.0   151.0    21.0     9.1     0.0     0.0    23.0     9.0    89.0

   RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                   18.0    24.0  9999.0     9.0     3.0     3.0     1.0     7.0    -4.0     4.0     2.0

        TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                   20.0  9999.0    35.0     5.5     4.0     7.2  9999.0
                   20.0  9999.0   -35.0     5.7     3.9     7.2  9999.0

       STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                   19.5    80.0     0.0    10.8    10.8     0.0     4.0    40.0
                   20.5   100.0     0.0    11.3    11.1     1.0     4.0    40.0

        ZIG-ZAG    SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                   20.0    20.0     7.0    10.0  9999.0  9999.0  9999.0     2.9

***** SHIP # 160 *****

      DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                    1.0   160.0     3.0    33.0   204.0   213.0    25.9    10.8     0.0     0.0    33.0    21.0   120.0

   RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                   23.0    27.0  9999.0  9999.0     3.0     3.0     1.0    14.8   -10.0     4.0     2.0

        TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                   24.0  9999.0    35.0    11.6     5.5    12.2  9999.0
                   24.0  9999.0   -35.0     8.8     5.5    15.0  9999.0

       STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                   23.0   100.0     0.0    16.9    16.9     0.5     4.3    40.0

        ZIG-ZAG    SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                   23.0    20.0     6.0     9.0  9999.0  9999.0  9999.0     2.4

***** SHIP # 161 *****

      DIMENSION    NATN    NMBR    TYPE    DISP    LKPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   17.0   161.0     2.0   313.0   320.0  9999.0    52.0    21.8     0.0     0.9   313.0    41.0   114.0

   RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                   15.0   148.0     6.4  9999.0     5.0     3.0     4.0    35.0   -12.0     2.0     2.0

        TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                   15.6     5.0   -35.0     9.5     4.4    10.2  9999.0
                   15.0  9999.0    35.0     9.4     4.6     9.9  9999.0
                   14.2  9999.0   -35.0    10.2     3.7     9.3  9999.0
                   13.7  9999.0    35.0    10.3     4.9    10.2  9999.0

       STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                   14.9   100.0     0.0    31.9    16.8    18.6    12.7  9999.0

        ZIG-ZAG    SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                   15.6  9999.0  9999.0  9999.0  9999.0     1.2  9999.0  9999.0
                   15.0  9999.0  9999.0  9999.0  9999.0     1.3  9999.0  9999.0
                   14.2  9999.0  9999.0  9999.0  9999.0     1.4  9999.0  9999.0
                   13.7  9999.0  9999.0  9999.0  9999.0     1.2  9999.0  9999.0
                   15.5    20.0    12.0    10.0     8.0     1.0     2.2     8.7

***** SHIP # 162 *****
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     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  9.0  162.0    1.0   86.0  266.0 9999.0   41.0   10.2    1.0    1.0 9999.0 9999.0 9999.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                 21.5   64.0    7.6 9999.0    3.0    1.0    1.0   17.5   -9.0    3.0    2.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 15.0 9999.0  -35.0    6.3    3.7    6.7   81.0
                 15.0 9999.0   35.0    5.8    3.0    5.6   84.0
                 15.0 9999.0   45.0    4.7    3.1    5.3   83.0
                 15.0 9999.0  -45.0    5.1    2.3    4.6   80.0
                 17.0 9999.0  -35.0    4.3    4.0    6.3   80.0
                 17.0 9999.0   35.0    9.2    3.4    6.5   78.0
                 17.0 9999.0  -45.0    4.4    3.3    5.7   78.0
                 17.0 9999.0   45.0    6.2    3.7    6.5   81.0
                 21.5 9999.0  -35.0    7.0    4.1    7.3   77.0
                 21.5 9999.0   35.0    6.2    3.6    6.4   82.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 21.0  100.0    0.0   27.8   27.8    0.0    7.8 9999.0

       ZIG-ZAG   SPDZ   RUDZ   OVSI   OVSF   OVSW   KPRM   TPRM   PERD
                 21.0   20.0   45.0   30.0 9999.0 9999.0 9999.0    6.3


***** SHIP # 163 *****

     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 14.0  163.0    2.0  111.0  250.0 9999.0   38.1   14.3    0.0 9999.0  111.0   26.5  108.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
               9999.0   60.0    7.5   12.0 9999.0    1.0    1.0   14.3    0.0 9999.0 9999.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 17.7 9999.0   35.0    5.1 9999.0 9999.0 9999.0
                 17.7 9999.0  -35.0    3.8 9999.0 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 17.8  100.0    0.0 9999.0   30.9    6.0   11.0 9999.0


***** SHIP # 164 *****

     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 14.0  164.0    2.0  111.0  250.0 9999.0   38.1   14.3    0.0 9999.0  111.0   26.5  108.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
               9999.0   60.0    7.5   12.0 9999.0    1.0    1.0   14.3    0.0 9999.0 9999.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 17.7 9999.0   35.0    5.8 9999.0 9999.0 9999.0
                 17.7 9999.0  -35.0    5.9 9999.0 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 17.8  100.0    0.0 9999.0   27.0    5.6   11.7 9999.0


***** SHIP # 165 *****

     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 14.0  165.0    1.0   62.0  215.0 9999.0   31.1   11.3    0.0 9999.0   62.0   19.0  103.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
               9999.0   44.0    7.0    9.0 9999.0    1.0    1.0   10.6    0.0 9999.0 9999.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
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                 17.2 9999.0   35.0 9999.0 9999.0    6.0 9999.0
                 17.2 9999.0  -35.0 9999.0 9999.0    6.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 17.2  100.0    0.0 9999.0   23.0 9999.0   10.3 9999.0

   ***** SHIP # 166 *****

     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 14.0  166.0    1.0   62.0  215.0 9999.0   31.1   11.3    0.0 9999.0   62.0   19.0  103.0

   RUDDER, PROP  SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               9999.0   44.0    7.0    9.0 9999.0    1.0    1.0   10.6    0.0 9999.0 9999.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 16.9 9999.0   35.0 9999.0 9999.0    5.4 9999.0
                 16.9 9999.0  -35.0 9999.0 9999.0    6.4 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 16.9  100.0    0.0 9999.0   18.2 9999.0   10.3 9999.0

   ***** SHIP # 167 *****

     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 14.0  167.0    1.0   62.0  215.0 9999.0   31.1   11.3    0.0 9999.0   62.0   19.0  103.0

   RUDDER, PROP  SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               9999.0   44.0    7.0    9.0 9999.0    1.0    1.0   10.6    0.0 9999.0 9999.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 17.5 9999.0   35.0 9999.0 9999.0    6.7 9999.0
                 17.5 9999.0  -35.0 9999.0 9999.0    6.7 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 17.5  100.0    0.0 9999.0 9999.0 9999.0    9.7 9999.0

   ***** SHIP # 168 *****

     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 14.0  168.0    1.0   62.0  215.0 9999.0   31.1   11.3    0.0 9999.0   62.0   19.0  103.0

   RUDDER, PROP  SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               9999.0   44.0    7.0    9.0 9999.0    1.0    1.0   10.6    0.0 9999.0 9999.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 17.2 9999.0   35.0 9999.0 9999.0    5.6 9999.0
                 17.2 9999.0  -35.0 9999.0 9999.0    6.4 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 17.2  100.0    0.0 9999.0   17.6 9999.0    9.3 9999.0

   ***** SHIP # 169 *****

     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 14.0  169.0    1.0   74.0  222.0 9999.0   33.5   11.8    0.0 9999.0 9999.0   21.9  116.0

   RUDDER, PROP  SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               9999.0   48.0    6.7   21.9 9999.0    3.0    1.0   14.0    0.0 9999.0 9999.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 17.6 9999.0   35.0    7.4 9999.0 9999.0 9999.0
                 17.6 9999.0  -35.0    9.8 9999.0 9999.0 9999.0
       STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  17.6  100.0    0.0 9999.0   36.5    3.0    3.5 9999.0

***** SHIP # 170 *****
      DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  14.0  170.0    1.0   64.0  239.0 9999.0   33.8    8.3   12.0 9999.0 9999.0   20.1  114.0
   RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                9999.0   52.0    7.0   20.1 9999.0    3.0    1.0   23.2    0.0 9999.0 9999.0
        TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  14.7 9999.0   35.0   12.0 9999.0 9999.0 9999.0
                  15.5 9999.0  -35.0   12.0 9999.0 9999.0 9999.0
       STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  15.7  100.0    0.0 9999.0   18.5 9999.0    8.2 9999.0

***** SHIP # 171 *****
      DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  14.0  171.0    1.0   65.0  214.0 9999.0   28.5   12.6    0.0 9999.0   65.0   13.8  118.0
   RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                9999.0   40.0    6.1   13.8 9999.0    3.0    1.0   13.8    0.0 9999.0 9999.0
        TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  14.8 9999.0   35.0    7.4 9999.0 9999.0 9999.0
                  14.8 9999.0  -35.0    6.9 9999.0 9999.0 9999.0

***** SHIP # 172 *****
      DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  14.0  172.0    3.0   29.0  214.0 9999.0   28.5    5.8   34.0 9999.0   65.0   13.8  118.0
   RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                9999.0   40.0    6.1   13.8 9999.0    3.0    1.0   28.4    0.0 9999.0 9999.0
        TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  17.5 9999.0   35.0    5.0 9999.0 9999.0 9999.0
                  17.5 9999.0  -35.0    4.4 9999.0 9999.0 9999.0

***** SHIP # 173 *****
      DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  14.0  173.0    3.0   66.0  220.0 9999.0   30.0   12.1    0.0 9999.0   66.0   12.6  135.0
   RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                9999.0   31.0    5.7   12.6 9999.0    3.0    1.0   11.6    0.0 9999.0 9999.0
        TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                9999.0 9999.0   35.0   14.6 9999.0 9999.0 9999.0
                9999.0 9999.0  -35.0   14.4 9999.0 9999.0 9999.0
       STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  14.0  100.0    0.0 9999.0 9999.0 9999.0   11.5 9999.0

***** SHIP # 174 *****
      DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
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                   14.0  174.0    3.0   39.0  220.0 9999.0   30.0    7.4   15.0 9999.0   66.0   12.6  135.0

    RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 9999.0   31.0    5.7   12.6 9999.0    3.0    1.0   19.8    0.0 9999.0 9999.0

         TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 9999.0 9999.0   35.0    9.0 9999.0 9999.0 9999.0
                 9999.0 9999.0  -35.0    8.6 9999.0 9999.0 9999.0

        STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 9999.0  100.0    0.0 9999.0 9999.0 9999.0    4.6 9999.0

***** SHIP # 175 *****

       DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   14.0  175.0    3.0   76.0  222.0 9999.0   32.0   12.9    1.0 9999.0   76.0   14.4  118.0

    RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 9999.0   44.0    6.2   14.4 9999.0    3.0    1.0   12.6    0.0 9999.0 9999.0

         TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                   15.0 9999.0   35.0    7.9 9999.0 9999.0 9999.0
                   15.0 9999.0  -35.0    7.4 9999.0 9999.0 9999.0

        STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                   15.0  100.0    0.0 9999.0   11.1 9999.0   13.5 9999.0

***** SHIP # 176 *****

       DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   14.0  176.0    3.0   39.0  222.0 9999.0   32.0    7.2    5.0 9999.0   76.0   14.4  119.0

    RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 9999.0   44.0    6.2   14.4 9999.0    1.0    1.0   25.3    0.0 9999.0 9999.0

         TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                   15.0 9999.0   35.0    6.6 9999.0 9999.0 9999.0
                   15.0 9999.0  -35.0    6.5 9999.0 9999.0 9999.0

        STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                   16.0  100.0    0.0 9999.0    5.6 9999.0    9.8 9999.0

***** SHIP # 177 *****

       DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   14.0  177.0    1.0   65.0  214.0 9999.0   31.7   11.9    2.0 9999.0   65.0   18.9  110.0

    RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 9999.0   35.0    6.9 9999.0 9999.0    1.0    1.0   10.3    0.0 9999.0 9999.0

         TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                   16.8 9999.0   35.0    5.9 9999.0 9999.0 9999.0
                   16.8 9999.0  -35.0    4.9 9999.0 9999.0 9999.0

        STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                   16.8  100.0    0.0 9999.0   20.3 9999.0    7.7 9999.0

***** SHIP # 178 *****

       DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   14.0  178.0    1.0   67.0  220.0 9999.0   32.2   11.6    0.0 9999.0   67.0   16.0  100.0
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RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
             9999.0   31.0    7.1    8.2 9999.0    3.0    1.0   16.4    0.0 9999.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
             9999.0 9999.0   35.0    6.3 9999.0 9999.0 9999.0
             9999.0 9999.0  -35.0    7.4 9999.0 9999.0 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               16.0  100.0    0.0 9999.0   27.0 9999.0    9.0 9999.0


***** SHIP # 179 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
               14.0  179.0    1.0   48.0  220.0 9999.0   32.2    8.7   11.0 9999.0   67.0   16.0  100.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
             9999.0   36.0    7.1    8.2 9999.0    1.0    1.0   23.0    0.0 9999.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
             9999.0 9999.0   35.0    4.8 9999.0 9999.0 9999.0
             9999.0 9999.0  -35.0    8.2 9999.0 9999.0 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               16.0  100.0    0.0 9999.0 9999.0 9999.0    7.0 9999.0


***** SHIP # 180 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
               14.0  130.0    3.0   97.0  240.0 9999.0   35.0   13.7    0.0 9999.0   97.0   16.1  122.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
             9999.0   53.0    6.1   16.1 9999.0    3.0    1.0   13.7    0.0 9999.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               15.0 9999.0   35.0    7.8 9999.0 9999.0 9999.0
               10.0 9999.0  -35.0   12.5 9999.0 9999.0 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               13.0  100.0    0.0 9999.0 9999.0 9999.0   13.0 9999.0


***** SHIP # 181 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
               14.0  181.0    3.0   58.0  240.0 9999.0   35.0    8.4   20.0 9999.0   97.0   16.1  122.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
             9999.0   40.0    6.1   16.1 9999.0    3.0    1.0   26.3    0.0 9999.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               12.0 9999.0   35.0    9.9 9999.0 9999.0 9999.0
               13.0 9999.0  -35.0    7.2 9999.0 9999.0 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               13.0  100.0    0.0 9999.0 9999.0 9999.0    8.5 9999.0


***** SHIP # 182 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
               14.0  182.0    3.0   76.0  222.0 9999.0   32.0   12.3    1.0 9999.0   76.0   14.4  118.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
             9999.0   42.0    6.2   12.0 9999.0    3.0    1.0   14.0    0.0 9999.0 9999.0
```

```
        TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  17.0 9999.0   35.0    8.1 9999.0 9999.0 9999.0
                  17.0 9959.0  -35.0    9.2 9999.0 9999.0 9999.0

       STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  17.0  100.0    0.0 9999.0   41.0 9999.0   14.8 9999.0

   ***** SHIP # 183 *****

      DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  14.0  183.0    3.0   39.0  222.0 9999.0   32.0    7.2    4.0 9999.0   76.0   14.4  118.0

   RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                9999.0   42.0    6.2   12.0 9999.0    3.0    1.0   25.3    0.0 9999.0 9999.0

        TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  17.0 9999.0   35.0    7.4 9999.0 9999.0 9999.0
                  17.0 9999.0  -35.0    7.4 9999.0 9999.0 9999.0

       STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  17.0  100.0    0.0 9999.0   26.0 9999.0   10.0 9999.0

   ***** SHIP # 184 *****

      DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  20.0  184.0    3.0   30.0  205.0 9999.0   31.0    5.6   83.0 9999.0 9999.0   12.8  122.0

   RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                9999.0   35.0    6.0   10.9 9999.0    3.0    1.0   27.5    0.0 9999.0 9999.0

        TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  16.4 9999.0   35.0    6.3 9999.0 9999.0 9999.0
                  16.4 9999.0  -35.0    6.3 9999.0 9999.0 9999.0

       STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  16.4  100.0    0.0 9999.0   18.1    1.5    7.6 9999.0

   ***** SHIP # 185 *****

      DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  20.0  185.0    3.0   29.0  216.0 9999.0   31.0    5.5   73.0 9999.0 9999.0   17.6  119.0

   RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                9999.0   26.0    6.2   15.3 9999.0    3.0    1.0   24.7    0.0 9999.0 9999.0

        TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  17.4 9999.0   35.0    6.8 9999.0 9999.0 9999.0
                  17.4 9999.0  -35.0    6.4 9999.0 9999.0 9999.0

   ***** SHIP # 186 *****

      DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  20.0  186.0    3.0   80.0  224.0 9999.0   35.4   12.1    0.0 9999.0   80.0   19.0  105.0

   RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                9999.0   35.0    6.8 9999.0 9999.0    1.0    1.0   10.6    0.0 9999.0 9999.0

        TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  15.0 9999.0   35.0    8.2 9999.0 9999.0 9999.0
                  15.0 9999.0  -35.0    8.0 9999.0 9999.0 9999.0
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[redacted]

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     STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 16.4  100.0    0.0 9999.0   30.2 9999.0   11.2 9999.0

***** SHIP # 187 *****

     DIMENSION   NATH   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 20.0  187.0    1.0   43.0  224.0 9999.0   35.4    6.8   54.0 9999.0   80.0   19.0  105.0

 RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               9999.0   35.0    6.8 9999.0 9999.0    1.0    1.0   24.8    0.0 9999.0 9999.0

     TURNING     SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 17.0 9999.0   35.0    7.1 9999.0 9999.0 9999.0
                 17.0 9999.0  -35.0    7.3 9999.0 9999.0 9999.0

     STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 17.7  100.0    0.0 9999.0   22.3 9999.0    8.3 9999.0

***** SHIP # 188 *****

     DIMENSION   NATH   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 20.0  188.0    1.0   48.0  239.0 9999.0   37.2    6.9   87.0 9999.0 9999.0   20.0  105.0

 RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               9999.0   42.0    7.0 9999.0 9999.0    1.0    1.0   28.7    0.0 9999.0 9999.0

     TURNING     SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 17.1 9999.0   35.0    7.6 9999.0 9999.0 9999.0
                 17.1 9999.0  -35.0    8.6 9999.0 9999.0 9999.0

     STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 17.1  100.0    0.0 9999.0    1.9 9999.0    8.0 9999.0

***** SHIP # 189 *****

     DIMENSION   NATH   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 20.0  189.0    1.0   92.0  218.0 9999.0 9999.0   13.5    0.0 9999.0   92.0   23.0  115.0

 RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               9999.0 9999.0    7.0    8.0 9999.0    1.0    1.0 9999.0 9999.0 9999.0 9999.0

     TURNING     SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               9999.0 9999.0   35.0    8.2 9999.0 9999.0 9999.0
               9999.0 9999.0  -35.0    7.1 9999.0 9999.0 9999.0

     STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 17.4  100.0    0.0 9999.0    3.8   11.5   24.0 9999.0

***** SHIP # 190 *****

     DIMENSION   NATH   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  5.0  190.0    2.0  140.0  260.0 9999.0   42.0   15.5    0.0 9999.0  140.0   26.0  112.0

 RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               9999.0   63.0    7.0   18.0 9999.0    3.0    1.0   25.3    0.0 9999.0 9999.0

     TURNING     SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 14.6 9999.0   35.0    8.3 9999.0 9999.0 9999.0
                 16.0 9999.0  -35.0    8.8 9999.0 9999.0 9999.0

     STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 15.8  100.0    0.0 9999.0   48.8   10.0   16.7 9999.0
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***** SHIP # 191 *****

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0   191.0     2.0   121.0   245.0  9999.0    40.0    15.1     0.0  9999.0   121.0    24.0   110.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                9999.0    53.0     6.9     8.7  9999.0     1.0     1.0    15.9     0.0  9999.0  9999.0

       TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  14.5  9999.0    35.0     6.9  9999.0  9999.0  9999.0
                  14.0  9999.0   -35.0     6.7  9999.0  9999.0  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  16.6   100.0     0.0  9999.0    40.3    16.7    13.9  9999.0


***** SHIP # 192 *****

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0   192.0     2.0   146.0   255.0  9999.0    42.0    16.5     0.0  9999.0   146.0    23.0   115.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                9999.0    63.0     6.6  9999.0  9999.0     3.0     1.0    22.2     0.0  9999.0  9999.0

       TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  16.6  9999.0    35.0     8.2  9999.0  9999.0  9999.0
                  16.6  9999.0   -35.0     9.0  9999.0  9999.0  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  14.5   100.0     0.0  9999.0    35.9     6.6    14.6  9999.0


***** SHIP # 193 *****

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0   193.0     1.0    85.0   235.0  9999.0    36.5    12.0     0.0  9999.0    85.0    19.5   115.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                9999.0    44.0     6.4    14.0  9999.0     3.0     1.0    19.3     0.0  9999.0  9999.0

       TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  16.6  9999.0    35.0     6.0  9999.0  9999.0  9999.0
                  12.8  9999.0   -35.0     7.4  9999.0  9999.0  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  16.4   100.0     0.0  9999.0    40.6     5.4    14.5  9999.0


***** SHIP # 194 *****

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0   194.0     2.0   125.0   262.0  9997.0    41.4    13.9     0.0  9999.0   125.0    23.8   104.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                9999.0    59.0     7.0     8.3  9999.0     1.0     1.0    16.5     0.0  9999.0  9999.0

       TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  17.1  9999.0    35.0     7.7  9999.0  9999.0  9999.0
                  17.2  9999.0   -35.0     8.6  9999.0  9999.0  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  17.2   100.0     0.0  9999.0     6.5  9999.0     6.0  9999.0
```

```
***** SHIP # 195 *****

    DIMENSION   NATN   NMDR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 5.0  195.0    2.0  102.0  239.0 9999.0   37.2   12.0    1.0 9999.0  102.0   20.7  118.0

RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
              9999.0   47.0    6.4 9999.0 9999.0    3.0    1.0   17.0    0.0 9999.0 9999.0

      TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                16.0 9999.0   35.0   10.0 9999.0 9999.0 9999.0
                16.1 9999.0  -35.0    7.6 9999.0 9999.0 9999.0

     STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                16.9  100.0    0.0 9999.0   34.7   19.4   12.7 9999.0

***** SHIP # 196 *****

    DIMENSION   NATN   NMDR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 5.0  196.0    1.0   83.0  232.0 9999.0   35.8   12.1    0.0 9999.0   83.0   20.7  114.0

RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
              9999.0   45.0    6.7   10.4 9999.0    3.0    1.0   13.3    0.0 9999.0 9999.0

      TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                14.0 9999.0   35.0    7.4 9999.0 9999.0 9999.0
                15.2 9999.0  -35.0    7.1 9999.0 9999.0 9999.0

***** SHIP # 197 *****

    DIMENSION   NATN   NMDR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 5.0  197.0    2.0  103.0  234.0 9999.0   37.0   14.4    0.0 9999.0  103.0   20.7  114.0

RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
              9999.0   45.0    6.6   10.4 9999.0    3.0    1.0   15.0    0.0 9999.0 9999.0

      TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                17.0 9999.0   35.0    7.7 9999.0 9999.0 9999.0
                17.0 9999.0  -35.0    7.5 9999.0 9999.0 9999.0

     STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                17.0  100.0    0.0 9999.0   29.4    6.0   11.5 9999.0

***** SHIP # 198 *****

    DIMENSION   NATN   NMDR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 5.0  198.0    2.0  122.0  246.0 9999.0   40.2   14.9    0.0 9999.0  122.0   23.0  112.0

RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
              9999.0   55.0    6.8    7.4 9999.0    3.0    1.0   19.4    0.0 9999.0 9999.0

      TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                16.2 9999.0   35.0    7.2 9999.0 9999.0 9999.0
                16.2 9999.0  -35.0    7.3 9999.0 9999.0 9999.0

     STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                16.2  100.0    0.0 9999.0   27.0   12.0   13.0 9999.0

***** SHIP # 199 *****

    DIMENSION   NATN   NMDR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 5.0  199.0    2.0  143.0  265.0 9999.0   44.2   15.1    0.0 9999.0  143.0   27.6  114.0
```

```
 RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
               9999.0    58.0     7.0    11.4  9999.0     3.0     1.0    19.6     0.0  9999.0  9999.0

      TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 16.7  9999.0    35.0     8.7  9999.0  9999.0  9999.0
                 16.7  9999.0   -35.0     9.2  9999.0  9999.0  9999.0

 ***** SHIP # 200 *****

    DIMENSION    NATN    NNBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  5.0   200.0     2.0   154.0   274.0  9999.0    45.4    14.8     0.0  9999.0   154.0    27.6   114.0

 RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
               9999.0    66.0     7.0    11.4  9999.0     3.0     1.0    21.4     0.0  9999.0  9999.0

      TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 16.8  9999.0    35.0     8.4  9999.0  9999.0  9999.0
                 16.8  9999.0   -35.0     8.9  9999.0  9999.0  9999.0

     STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 16.8   100.0     0.0  9999.0    24.0    22.0    13.2  9999.0

 ***** SHIP # 201 *****

    DIMENSION    NATN    NNBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  5.0   201.0     3.0    28.0   213.0  9999.0    31.1     4.0    72.0  9999.0  9999.0    16.0   105.0

 RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
               9999.0    32.0     6.6     6.0  9999.0     1.0     1.0    30.1     0.0  9999.0  9999.0

      TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 17.1  9999.0    35.0     6.4  9999.0  9999.0  9999.0
                 17.1  9999.0   -35.0     6.0  9999.0  9999.0  9999.0

     STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 17.6   100.0     0.0  9999.0    18.4     2.7     6.4  9999.0

 ***** SHIP # 202 *****

    DIMENSION    NATN    NNBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  5.0   202.0     1.0    71.0   213.0  9999.0    32.2    13.2     0.0  9999.0    71.0    18.4   114.0

 RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
               9999.0    35.0     6.6  9999.0  9999.0     3.0     1.0    12.5     0.0  9999.0  9999.0

      TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 17.3  9999.0    35.0     5.8  9999.0  9999.0  9999.0
                 17.3  9999.0   -35.0     6.6  9999.0  9999.0  9999.0

     STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 17.2   100.0     6.0  9999.0    22.0     9.0     7.9  9999.0

 ***** SHIP # 203 *****

    DIMENSION    NATN    NNBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  5.0   203.0     3.0    34.0   216.0  9999.0    31.1     6.2    34.0  9999.0  9999.0    17.6   119.0

 RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
               9999.0    33.0     6.2  9999.0  9999.0     3.0     1.0    26.6     0.0  9999.0  9999.0

      TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 17.3  9999.0    35.0     6.6  9999.0  9999.0  9999.0
```

```
                17.3 9999.0  -35.0     6.7 9999.0 9999.0 9999.0

     STOPPING   SPDS   SHPS   RUDS    TDIS   HRCH   SRCH   TIMS   TIMR
                17.2  100.0    0.0  9999.0   15.7    2.3    5.7 9999.0

 ***** SHIP # 204 *****

    DIMENSION   NATN   NMBR   TYPE    DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 5.0  204.0    2.0   244.0  326.0 9999.0   49.8   17.6    1.0 9999.0  244.0   33.0  101.0

 RUDDER, PROP   SSPD   RDAR   PDIA    ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
              9999.0   91.0    7.8  9999.0 9999.0    1.0    1.0   21.7    0.0 9999.0 9999.0

      TURNING   SPDT   SPDF   RUDT    ADVT   TRNT   DIAT   FRPM
                16.4 9999.0   35.0     9.8 9999.0 9999.0 9999.0
                15.5 9999.0  -35.0     9.2 9999.0 9999.0 9999.0

     STOPPING   SPDS   SHPS   RUDS    TDIS   HRCH   SRCH   TIMS   TIMR
                16.6  100.0    0.0  9999.0   35.1   26.4   20.9 9999.0

 ***** SHIP # 205 *****

    DIMENSION   NATN   NMBR   TYPE    DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 5.0  205.0    2.0   208.0  310.0 9999.0   47.2   16.4    0.0 9999.0  208.0   28.0   85.0

 RUDDER, PROP   SSPD   RDAR   PDIA    ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
              9999.0   75.0    0.8  9999.0 9999.0    1.0    1.0   28.2    0.0 9999.0 9999.0

      TURNING   SPDT   SPDF   RUDT    ADVT   TRNT   DIAT   FRPM
                16.0 9999.0   35.0    12.6 9999.0 9999.0 9999.0
                15.0 9999.0  -35.0     9.5 9999.0 9999.0 9999.0

     STOPPING   SPDS   SHPS   RUDS    TDIS   HRCH   SRCH   TIMS   TIMR
                15.9  100.0    0.0  9999.0   26.8   12.9   19.6 9999.0

 ***** SHIP # 206 *****

    DIMENSION   NATN   NMBR   TYPE    DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 5.0  206.0    2.0   183.0  290.0 9999.0   47.5   16.0   -2.0 9999.0  183.0   30.0   97.0

 RUDDER, PROP   SSPD   RDAR   PDIA    ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
              9999.0   71.0    7.8  9999.0 9999.0    1.0    1.0   26.0    0.0 9999.0 9999.0

      TURNING   SPDT   SPDF   RUDT    ADVT   TRNT   DIAT   FRPM
                16.0 9999.0   35.0     8.8 9999.0 9999.0 9999.0
                16.2 9999.0  -35.0     7.8 9999.0 9999.0 9999.0

     STOPPING   SPDS   SHPS   RUDS    TDIS   HRCH   SRCH   TIMS   TIMR
                16.8  100.0    0.0  9999.0   36.8   10.1   15.7 9999.0

 ***** SHIP # 207 *****

    DIMENSION   NATN   NMBR   TYPE    DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 5.0  207.0    2.0   112.0  265.0 9999.0   38.9   13.0    3.0 9999.0  112.0   22.0   82.0

 RUDDER, PROP   SSPD   RDAR   PDIA    ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
              9999.0   49.0    8.0  9999.0 9999.0    1.0    1.0   18.4    0.0 9999.0 9999.0

      TURNING   SPDT   SPDF   RUDT    ADVT   TRNT   DIAT   FRPM
                16.3 9999.0   35.0     9.0 9999.0 9999.0 9999.0
                16.5 9999.0  -35.0     8.5 9999.0 9999.0 9999.0
     STOPPING    SPDS   SHPS    RUDS   TDIS    HRCH    SRCH    TIMS   TIMR
                 16.2  100.0     0.0 9999.0    26.5     9.7    13.0 9999.0

***** SHIP # 208 *****

    DIMENSION    NATN   NMBR    TYPE   DISP    LBPX   LOAX    BEAM    DRFT    TRIM   BULB    DDIS    SSHP   SRPM
                  5.0  208.0     2.0  100.6   243.0 9999.0    37.2    13.1     1.0 9999.0  100.0    24.0  108.0

 RUDDER, PROP    SSPD   RDAR    PDIA   ASHP    RDST   ENGN    PROP    LATA    LCAX   WHWV    TRLC
               9999.0   45.0     7.0 9999.0  9999.0    1.0     1.0    13.2     0.0 9999.0 9999.0

      TURNING    SPDT   SPDF    RUDT   ADVT    TRNT   DIAT    FRPM
                 17.0 9999.0    35.0    6.9  9999.0 9999.0  9999.0
                 17.0 9999.0   -35.0    7.4  9999.0 9999.0  9999.0

     STOPPING    SPDS   SHPS    RUDS   TDIS    HRCH    SRCH    TIMS   TIMR
                 16.4  100.0     0.0 9999.0    24.4    10.0    12.4 9999.0

***** SHIP # 209 *****

    DIMENSION    NATN   NMBR    TYPE   DISP    LBPX   LOAX    BEAM    DRFT    TRIM   BULB    DDIS    SSHP   SRPM
                  5.0  209.0     3.0   36.0   213.0 9999.0    31.7     6.6    24.0 9999.0 9999.0    15.0  122.0

 RUDDER, PROP    SSPD   RDAR    PDIA   ASHP    RDST   ENGN    PROP    LATA    LCAX   WHWV    TRLC
               9999.0   36.0     6.0 9999.0  9999.0    3.0     1.0    25.6     0.0 9999.0 9999.0

      TURNING    SPDT   SPDF    RUDT   ADVT    TRNT   DIAT    FRPM
                 16.4 9999.0    35.0    7.5  9999.0 9999.0  9999.0
                 16.4 9999.0   -35.0    6.7  9999.0 9999.0  9999.0

     STOPPING    SPDS   SHPS    RUDS   TDIS    HRCH    SRCH    TIMS   TIMR
                 16.4  100.0     0.0 9999.0    21.5     3.6     8.2 9999.0

***** SHIP # 210 *****

    DIMENSION    NATN   NMBR    TYPE   DISP    LBPX   LOAX    BEAM    DRFT    TRIM   BULB    DDIS    SSHP   SRPM
                  5.0  210.0     2.0  143.0   256.0 9999.0    42.5    15.7     0.0 9999.0  143.0    24.0  105.0

 RUDDER, PROP    SSPD   RDAR    PDIA   ASHP    RDST   ENGN    PROP    LATA    LCAX   WHWV    TRLC
               9999.0   63.0     7.2    8.8  9999.0    1.0     1.0    18.6     0.0 9999.0 9999.0

      TURNING    SPDT   SPDF    RUDT   ADVT    TRNT   DIAT    FRPM
                 15.5 9999.0    35.0    8.2  9999.0 9999.0  9999.0
                 15.5 9999.0   -35.0    8.6  9999.0 9999.0  9999.0

     STOPPING    SPDS   SHPS    RUDS   TDIS    HRCH    SRCH    TIMS   TIMR
                 15.5  100.0     0.0 9999.0    21.2    17.2    14.5 9999.0

***** SHIP # 211 *****

    DIMENSION    NATN   NMBR    TYPE   DISP    LBPX   LOAX    BEAM    DRFT    TRIM   BULB    DDIS    SSHP   SRPM
                  5.0  211.0     2.0   71.0   256.0 9999.0    42.5     8.3    25.0 9999.0  143.0    24.0  105.0

 RUDDER, PROP    SSPD   RDAR    PDIA   ASHP    RDST   ENGN    PROP    LATA    LCAX   WHWV    TRLC
               9999.0   63.0     7.2    8.8  9999.0    1.0     1.0    37.7     0.0 9999.0 9999.0

      TURNING    SPDT   SPDF    RUDT   ADVT    TRNT   DIAT    FRPM
                 17.8 9999.0    35.0    8.0  9999.0 9999.0  9999.0
                 17.8 9999.0   -35.0    7.9  9999.0 9999.0  9999.0

     STOPPING    SPDS   SHPS    RUDS   TDIS    HRCH    SRCH    TIMS   TIMR
                 17.7  100.0     0.0 9999.0    28.1     5.0    11.2 9999.0
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***** SHIP # 212 *****

  DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    BDIS    SSHP    SRPM
                5.0   212.0     3.0    37.0   224.0  9999.0    31.4     6.5    24.0  9999.0  9999.0    10.4   172.0

RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TDLC
             9999.0    37.0     6.2  9999.0  9999.0     3.0     1.0    29.4     0.0  9999.0  9999.0

     TURNING   SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
               17.2  9999.0    35.0     8.1  9999.0  9999.0  9999.0
               17.?  9999.0   -35.0     7.0  9999.0  9999.0  9999.0

    STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
               17.0   100.0     0.0  9999.0    16.3     2.0     5.2  9999.0

***** SHIP # 213 *****

  DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    BDIS    SSHP    SRPM
                5.0   213.0     3.0    66.0   230.0  9999.0    31.1    11.6     0.0  9999.0    66.0    13.0   105.0

RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TDLC
             9999.0    33.0     6.6     5.4  9999.0     1.0     1.0    11.9     0.0  9999.0  9999.0

     TURNING   SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
               15.2  9999.0    35.0     6.5  9999.0  9999.0  9999.0
               15.4  9999.0   -35.0     7.3  9999.0  9999.0  9999.0

    STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
               14.5   100.0     0.0  9999.0    14.1    11.3     9.0  9999.0

***** SHIP # 214 *****

  DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    BDIS    SSHP    SRPM
                5.0   214.0     2.0   244.0   310.0  9999.0    47.2    10.9     0.0  9999.0   244.0    28.0    85.0

RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TDLC
             9999.0    75.0     0.0    13.4  9999.0     1.0     1.0    20.4     0.0  9999.0  9999.0

     TURNING   SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
               15.4  9999.0    35.0    10.0  9999.0  9999.0  9999.0
               15.4  9999.0   -35.0    10.0  9999.0  9999.0  9999.0

    STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
               15.9   100.0     0.0  9999.0    44.6     6.0    22.5  9999.0

***** SHIP # 215 *****

  DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    BDIS    SSHP    SRPM
                5.0   215.0     1.0    83.0   2?6.0  9999.0    36.0    12.3     0.0  9999.0    83.0    20.0   105.0

RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TDLC
             9999.0    37.0     7.0     0.0  9999.0     1.0     1.0    11.0     0.0  9999.0  9999.0

     TURNING   SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
               14.6  9999.0    35.0     6.2  9999.0  9999.0  9999.0
               14.6  9999.0   -35.0     7.0  9999.0  9999.0  9999.0

    STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
               14.6   100.0     0.0  9999.0    15.8    11.1    10.3  9999.0
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[redacted]

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***** SHIP # 216 *****

   DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 5.0  216.0    3.0   68.0  220.0 9999.0   31.1   11.6    0.0 9999.0   68.0   13.4  105.0

RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
              9999.0   33.0    6.6    5.4 9999.0    1.0    1.0   12.0    0.0 9999.0 9999.0

     TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                15.2 9999.0   35.0    6.4 9999.0    5.5 9999.0
                15.4 9999.0  -35.0    7.2 9999.0    6.0 9999.0

    STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                14.5  100.0    0.0 9999.0   22.6   11.5    9.0 9999.0

***** SHIP # 217 *****

   DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 5.0  217.0    1.0   87.0  223.0 9999.0   37.2   12.5    0.0 9999.0   87.0   20.7  119.0

RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
              9999.0   44.0    6.4 9999.0 9999.0    3.0    1.0   14.0    0.0 9999.0 9999.0

     TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                16.0 9999.0   35.0    7.0 9999.0    5.2 9999.0
                16.0 9999.0  -35.0    7.1 9999.0    5.5 9999.0

    STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                16.1  100.0    0.0 9999.0   22.5   11.2    9.2 9999.0

***** SHIP # 218 *****

   DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 5.0  218.0    2.0  134.0  256.0 9999.0   42.5   14.9    0.0 9999.0  134.0   24.0  105.0

RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
              9999.0   57.0    7.2    8.8 9999.0    1.0    1.0   17.2    0.0 9999.0 9999.0

     TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                16.1 9999.0   35.0    7.6 9999.0    5.4 9999.0
                16.1 9999.0  -35.0    8.4 9999.0    6.6 9999.0

    STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                16.1  100.0    0.0 9999.0   35.8    4.0   12.6 9999.0

***** SHIP # 219 *****

   DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 5.0  219.0    2.0  143.0  254.0 9999.0   42.5   15.7    0.0 9999.0  143.0   24.0  105.0

RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
              9999.0   63.0    7.2    8.8 9999.0    1.0    1.0   18.6    0.0 9999.0 9999.0

     TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                15.3 9999.0   35.0    8.1 9999.0    5.7 9999.0
                15.5 9999.0  -35.0    8.0 9999.0    6.2 9999.0

    STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                15.5  100.0    0.0 9999.0   31.4   15.4   14.1 9999.0

***** SHIP # 220 *****
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   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 5.0   220.0     2.0    71.0   256.0  9999.0    42.5     8.3    25.0  9999.0   143.0    24.0   105.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
              9999.0    54.0     7.2     8.8  9999.0     1.0     1.0    37.7     0.0  9999.0  9999.0

     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                17.8  9999.0    35.0     7.8  9999.0     5.2  9999.0
                17.8  9999.0   -35.0     7.8  9999.0     5.2  9999.0

    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                17.7   100.0     0.0  9999.0    29.7     5.0    11.0  9999.0


***** SHIP # 221 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 5.0   221.0     2.0   243.0   300.0  9999.0    50.0    18.9     0.0  9999.0   243.0    36.0    90.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
              9999.0    92.0     8.6    13.0  9999.0     1.0     1.0    27.2     0.0  9999.0  9999.0

     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                16.7  9999.0    35.0     8.8  9999.0     6.5  9999.0
                16.7  9999.0   -35.0     9.2  9999.0     6.5  9999.0

    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                16.7   100.0     0.0  9999.0    45.0    22.6    19.0  9999.0


***** SHIP # 222 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 5.0   222.0     2.0   114.0   300.0  9999.0    50.0     9.4    51.0  9999.0   243.0    36.0    90.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
              9999.0    84.0     8.6    13.0  9999.0     1.0     1.0    55.7     0.0  9999.0  9999.0

     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                18.3  9999.0    35.0     8.6  9999.0     6.5  9999.0
                18.3  9999.0   -35.0     8.6  9999.0     6.4  9999.0

    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                18.3   100.0     0.0  9999.0    36.4     1.2    12.0  9999.0


***** SHIP # 223 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 5.0   223.0     2.0   244.0   310.0  9999.0    47.2    18.9     0.0  9999.0   244.0    28.0    85.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
              9999.0    75.0     8.8    13.0  9999.0     1.0     1.0    20.4     0.0  9999.0  9999.0

     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                15.4  9999.0    35.0    10.8  9999.0     9.0  9999.0
                15.4  9999.0   -35.0    10.8  9999.0    10.4  9999.0

    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                15.9   100.0     0.0  9999.0    49.1     6.8    22.1  9999.0


***** SHIP # 224 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 5.0   224.0     1.0    83.0   232.0  9999.0    35.8    12.1     0.0  9999.0    83.0    20.7   114.0
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BEST DOCUMENT AVAILABLE

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  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                9999.0    42.0     6.8    10.4  9999.0     3.0     1.0    13.2     0.0  9999.0  9999.0

       TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  14.0  9999.0    35.0     7.4  9999.0     6.8  9999.0
                  15.2  9999.0   -35.0     7.1  9999.0     6.6  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  17.4   100.0     0.0  9999.0    27.7  9999.0    10.1  9999.0

 ***** SHIP # 225 *****

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0   225.0     2.0   122.0   246.0  9999.0    42.2    14.9     0.0  9999.0   122.0    23.0   114.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                9999.0    55.0     6.8     7.4  9999.0     3.0     1.0    19.4     0.0  9999.0  9999.0

       TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  16.2  9999.0    35.0     7.2  9999.0     5.6  9999.0
                  16.0  9999.0   -35.0     7.3  9999.0     6.4  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  16.6   100.0     0.0  9999.0    34.7    12.0    13.0  9999.0

 ***** SHIP # 226 *****

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0   226.0     2.0   143.0   263.0  9999.0    44.2    15.1     0.0  9999.0   143.0    27.6   114.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                9999.0    61.0     7.0    11.4  9999.0  9999.0  9999.0    19.7     0.0  9999.0  9999.0

       TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  16.6  9999.0    35.0     8.7  9999.0     7.2  9999.0
                  16.6  9999.0   -35.0     9.2  9999.0     8.4  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  16.0   100.0     0.0  9999.0    39.5  9999.0    14.0  9999.0

 ***** SHIP # 227 *****

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0   227.0     2.0   103.0   234.0  9999.0    37.0    14.4     0.0  9999.0   103.0    20.7   114.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                9999.0    45.0     6.6    10.4  9999.0  9999.0  9999.0    12.6     0.0  9999.0  9999.0

       TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  17.0  9999.0    35.0     7.7  9999.0     8.5  9999.0
                  17.0  9999.0   -35.0     7.8  9999.0     7.3  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  17.0   100.0     0.0  9999.0    33.3     5.9    11.5  9999.0
                   8.9   100.0     0.0  9999.0     6.9     4.9     2.0  9999.0

 ***** SHIP # 228 *****

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0   228.0     1.0    84.0   230.0  9999.0    36.0    12.2     1.0  9999.0    84.0    18.4   114.0
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RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
              9999.0    40.0     6.5  9999.0  9999.0  9999.0  9999.0    12.1     0.0  9999.0  9999.0

    TURNING     SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                16.3  9999.0    35.0     6.0  9999.0     5.2  9999.0
                16.3  9999.0   -35.0     6.2  9999.0     5.7  9999.0


***** SHIP # 229 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 5.0   229.0     1.0    92.0   235.0  9999.0    37.6    12.6     0.0  9999.0    92.0    20.7   114.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
              9999.0    42.0     6.7  9999.0  9999.0  9999.0  9999.0    15.1     0.0  9999.0  9999.0

    TURNING     SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                13.6  9999.0    35.0     6.5  9999.0     6.2  9999.0
                14.6  9999.0   -35.0     6.4  9999.0     5.6  9999.0


***** SHIP # 230 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 5.0   230.0     2.0   126.0   246.0  9999.0    39.4    15.5     0.0  9999.0   126.0    23.0   114.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
              9999.0    54.0     6.9  9999.0  9999.0  9999.0  9999.0    19.3     0.0  9999.0  9999.0

    TURNING     SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                16.2  9999.0    35.0     7.2  9999.0     7.0  9999.0
                16.2  9999.0   -35.0     7.2  9999.0     7.0  9999.0


***** SHIP # 231 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 5.0   231.0     2.0   174.0   280.0  9999.0    44.0    16.0     0.0  9999.0   174.0    27.6   114.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
              9999.0    70.0     7.1  9999.0  9999.0  9999.0  9999.0    23.7     0.0  9999.0  9999.0

    TURNING     SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                12.5  9999.0    35.0     3.4  9999.0     6.7  9999.0
                14.9  9999.0   -35.0     7.3  9999.0     9.1  9999.0


***** SHIP # 232 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 5.0   232.0     2.0    82.0   280.0  9999.0    44.0     8.5     0.0  9999.0   174.0    27.6   114.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
              9999.0    70.0     7.1  9999.0  9999.0  9999.0  9999.0    44.7     0.0  9999.0  9999.0

    TURNING     SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                14.6  9999.0    35.0     6.9  9999.0     5.8  9999.0


***** SHIP # 233 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 5.0   233.0     2.0   174.0   304.0  9999.0    44.0    16.0     0.0  9999.0   174.0    27.6   114.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
              9999.0    70.0     7.1  9999.0  9999.0  9999.0  9999.0    27.9     0.0  9999.0  9999.0
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        TURNING     SPDT   SPDF    RUDT    ADVT    TRNT    DIAT   FRPM
                    15.8 9999.0    35.0     9.4 9999.0     8.7 9999.0
                    16.0 9999.0   -35.0     8.6 9999.0     7.9 9999.0

  ***** SHIP # 234 *****

      DIMENSION     NATN   NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                     5.0  234.0     2.0    91.0   304.0 9999.0    44.0     8.6    43.0 9999.0   174.0    27.6   114.0
    RUDDER, PROP    SSPD   RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  9999.0   70.0     7.1 9999.0 9999.0 9999.0 9999.0    50.4     0.0 9999.0 9999.0
        TURNING     SPDT   SPDF    RUDT    ADVT    TRNT    DIAT   FRPM
                    17.4 9999.0    35.0     9.8 9999.0    10.0 9999.0
                    17.2 9999.0   -35.0     8.6 9999.0     6.6 9999.0

  ***** SHIP # 235 *****

      DIMENSION     NATN   NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                     5.0  235.0     1.0    91.0   232.0 9999.0    37.1    12.4     0.0 9999.0    91.0    20.7   119.0
    RUDDER, PROP    SSPD   RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  9999.0   42.0     6.4 9999.0 9999.0 9999.0 9999.0    15.2     0.0 9999.0 9999.0
        TURNING     SPDT   SPDF    RUDT    ADVT    TRNT    DIAT   FRPM
                    16.2 9999.0    35.0     6.9 9999.0     6.6 9999.0
                    16.2 9999.0   -35.0     6.4 9999.0     6.2 9999.0
       STOPPING     SPDS   SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                    16.5  100.0     0.0 9999.0    25.0     3.8     9.6 9999.0

  ***** SHIP # 236 *****

      DIMENSION     NATN   NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                     5.0  236.0     1.0    70.0   224.0 9999.0    32.2    11.5     1.0 9999.0    70.0    17.6   119.0
    RUDDER, PROP    SSPD   RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  9999.0   38.0     6.1 9999.0 9999.0 9999.0 9999.0    12.5     0.0 9999.0 9999.0
        TURNING     SPDT   SPDF    RUDT    ADVT    TRNT    DIAT   FRPM
                    15.8 9999.0    35.0     6.3 9999.0     5.5 9999.0
                    15.8 9999.0   -35.0     6.7 9999.0     6.7 9999.0
       STOPPING     SPDS   SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                    15.8  100.0     0.0 9999.0    24.2 9999.0     8.2 9999.0

  ***** SHIP # 237 *****

      DIMENSION     NATN   NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                     5.0  237.0     3.0    33.0   237.0 9999.0    31.8     5.8    41.0 9999.0 9999.0    16.0   122.0
    RUDDER, PROP    SSPD   RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  9999.0   30.0     6.0 9999.0 9999.0 9999.0 9999.0    29.4     0.0 9999.0 9999.0
        TURNING     SPDT   SPDF    RUDT    ADVT    TRNT    DIAT   FRPM
                    16.3 9999.0    35.0     7.2 9999.0     6.0 9999.0
                    16.3 9999.0   -35.0     7.4 9999.0     5.3 9999.0
       STOPPING     SPDS   SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                    16.3  100.0     0.0 9999.0    19.1     2.4     7.8 9999.0
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***** SHIP # 238 *****

   DIMENSION     NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  5.0   238.0     3.0    46.0   237.0  9999.0    38.5    16.4    35.0  9999.0  9999.0    20.7   119.0

 RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
               9999.0    42.0     6.4  9999.0  9999.0     3.0     1.0    33.1     0.0  9999.0  9999.0

     TURNING     SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 17.0  9999.0    35.0     7.8  9999.0     5.9  9999.0
                 17.0  9999.0   -35.0     6.9  9999.0     6.0  9999.0

    STOPPING     SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 17.0   100.0     0.0  9999.0    23.1  9999.0     8.5  9999.0

***** SHIP # 239 *****

   DIMENSION     NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  5.0   239.0     2.0   244.0   326.0  9999.0    49.8    17.6     1.0  9999.0   244.0    33.0   101.0

 RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
               9999.0    91.0     7.8  9999.0  9999.0     1.0     1.0    21.7     0.0  9999.0  9999.0

     TURNING     SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 16.4  9999.0    35.0     9.6  9999.0     8.7  9999.0
                 15.5  9999.0   -35.0     9.0  9999.0     7.5  9999.0

    STOPPING     SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 16.6   100.0     0.0  9999.0    35.1    26.4    21.0  9999.0

***** SHIP # 240 *****

   DIMENSION     NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  5.0   240.0     2.0   161.0   260.0  9999.0    43.5    17.0     1.0  9999.0   161.0    23.0   122.0

 RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
               9999.0    70.0     6.6  9999.0  9999.0     3.0     1.0    17.7     0.0  9999.0  9999.0

     TURNING     SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 15.3  9999.0    35.0     8.3  9999.0     6.2  9999.0
                 15.4  9999.0   -35.0     9.0  9999.0     7.5  9999.0

    STOPPING     SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 15.5   100.0     0.0  9999.0    29.0    19.0    16.4  9999.0

***** SHIP # 241 *****

   DIMENSION     NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  5.0   241.0     2.0   112.0   265.0  9999.0    38.9    13.0     3.0  9999.0   112.0    22.0    82.0

 RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
               9999.0    49.0     8.0  9999.0  9999.0     1.0     1.0    18.4     0.0  9999.0  9999.0

     TURNING     SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 16.3  9999.0    35.0     9.0  9999.0     7.3  9999.0
                 16.5  9999.0   -35.0     8.5  9999.0     6.7  9999.0

    STOPPING     SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 16.2   100.0     0.0  9999.0    26.5     9.1    13.0  9999.0

***** SHIP # 242 *****
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      DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   5.0  242.0    1.0   78.0  220.0 9999.0   35.0   12.2    1.0 9999.0   78.0   20.7  119.0

   RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   UNWV   TRLC
                9999.0   40.0    6.5 9999.0 9999.0    3.0    1.0   14.2    0.0 9999.0 9999.0

        TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  17.1 9999.0   35.0    8.2 9999.0    7.0 9999.0
                  17.1 9999.0  -35.0    8.4 9999.0    7.4 9999.0

       STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  17.3  100.0    0.0 9999.0   25.4   32.0   10.0 9999.0

  ***** SHIP # 243 *****

      DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   5.0  243.0    2.0  208.0  313.0 9999.0   48.2   16.5    0.0 9999.0  208.0   28.0   90.0

   RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   UNWV   TRLC
                9999.0   98.0    8.1 9999.0 9999.0    1.0    1.0   29.7    0.0 9999.0 9999.0

        TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  16.3 9999.0   35.0    9.0 9999.0    8.0 9999.0
                  16.0 9999.0   35.0    9.9 9999.0 9999.0 9999.0

       STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  15.8  100.0    0.0 9999.0   42.0 9999.0   16.0 9999.0

  ***** SHIP # 244 *****

      DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   5.0  244.0    2.0  180.0  281.0 9999.0   46.2   16.5    0.0 9999.0  180.0   28.0   85.0

   RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   UNWV   TRLC
                9999.0 9999.0    8.2 9999.0 9999.0    1.0    1.0   26.7    0.0 9999.0 9999.0

        TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  16.0 9999.0   35.0    9.9 9999.0    8.0 9999.0
                  16.0 9999.0  -35.0    9.7 9999.0 9999.0 9999.0

       STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  17.0  100.0    0.0 9999.0   42.0 9999.0   14.2 9999.0

  ***** SHIP # 245 *****

      DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   5.0  245.0    1.0  119.0  257.0 9999.0   38.8   17.3  -29.0 9999.0  119.0   28.0  109.0

   RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   UNWV   TRLC
                9999.0 9999.0    7.2 9999.0 9999.0    1.0    1.0    8.5    0.0 9999.0 9999.0

        TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  17.6 9999.0   35.0    8.1 9999.0 9999.0 9999.0
                  17.5 9999.0  -35.0    8.8 9999.0 9999.0 9999.0

       STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  17.9  100.0    0.0 9999.0   35.3 9999.0   12.6 9999.0

  ***** SHIP # 246 *****

      DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
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                     5.0  246.0 9999.0   68.0  216.0 9999.0   33.0   11.4    0.0 9999.0   68.0   18.4  119.0

RUDDER, PROP        SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                  9999.0 9999.0    6.5 9999.0 9999.0 9999.0    1.0   12.5    0.0 9999.0 9999.0

     TURNING        SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                    17.1 9999.0   35.0    8.4 9999.0 9999.0 9999.0
                    17.1 9999.0  -35.0    7.5 9999.0 9999.0 9999.0

    STOPPING        SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                    17.1  100.0    0.0 9999.0 9999.0 9999.0    8.4 9999.0

***** SHIP # 247 *****

   DIMENSION        NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                     5.0  247.0    2.0  123.0  243.0 9999.0   40.0   15.1    0.0 9999.0  123.0   24.0  110.0

RUDDER, PROP        SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                  9999.0   53.0    6.9    9.6 9999.0    1.0    1.0   15.9    0.0 9999.0 9999.0

     TURNING        SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                    14.5 9999.0   35.0    6.9 9999.0    5.6 9999.0
                    14.0 9999.0  -35.0    6.7 9999.0    6.7 9999.0

    STOPPING        SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                    16.6  100.0    0.0 9999.0   40.3   16.3   13.9 9999.0

***** SHIP # 248 *****

   DIMENSION        NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                     5.0  248.0    2.0  125.0  262.0 9999.0   41.4   13.9    0.0 9999.0  125.0   23.8  104.0

RUDDER, PROP        SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                  9999.0   50.0    7.0   11.6 9999.0    1.0    1.0   16.5    0.0 9999.0 9999.0

     TURNING        SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                    17.1 9999.0   35.0    7.7 9999.0    5.6 9999.0
                    17.2 9999.0  -35.0    8.6 9999.0    6.6 9999.0

    STOPPING        SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                    17.2  100.0    0.0 9999.0   31.6 9999.0   13.7 9999.0

***** SHIP # 249 *****

   DIMENSION        NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                     5.0  249.0    1.0   72.0  230.0 9999.0   32.2   11.3   -3.0 9999.0   72.0   18.4  115.0

RUDDER, PROP        SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                  9999.0   40.0    6.5 9999.0 9999.0    3.0    1.0   21.1    0.0 9999.0 9999.0

     TURNING        SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                    13.2 9999.0   35.0    6.8 9999.0    6.3 9999.0
                    13.4 9999.0  -35.0    7.0 9999.0    6.7 9999.0

    STOPPING        SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                    15.8  100.0    0.0 9999.0   33.3    2.2   11.5 9999.0

***** SHIP # 250 *****

   DIMENSION        NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                     5.0  250.0    2.0  140.0  260.0 9999.0   42.0   15.5    0.0 9999.0  140.0   24.2  115.0
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RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
             9999.0   63.0    6.7 9999.0 9999.0    3.0    1.0   22.8    0.0 9999.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               15.0 9999.0   35.0    7.7 9999.0    6.3 9999.0
               15.5 9999.0  -35.0    8.4 9999.0    7.0 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               16.3  100.0    0.0 9999.0   41.2    7.0   12.8 9999.0

***** SHIP # 251 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                5.0  251.0    2.0  215.0  302.0 9999.0   50.4   17.1    0.0 9999.0  215.0   34.0   94.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
             9999.0   86.0    8.2   13.6 9999.0    1.0    1.0   22.5    0.0 9999.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               17.2 9999.0   35.0    9.4 9999.0    5.6 9999.0
               17.3 9999.0  -35.0    8.7 9999.0    6.4 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               17.3  100.0    0.0 9999.0   46.1   20.0   15.6 9999.0

***** SHIP # 252 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                5.0  252.0    2.0  101.0  304.0 9999.0   50.4    8.6   45.0 9999.0 9999.0   34.0   94.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
             9999.0   86.0    8.2   13.6 9999.0    1.0    1.0   48.1    0.0 9999.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                5.1 9999.0   35.0    7.7 9999.0 9999.0 9999.0
                5.2 9999.0  -35.0    7.9 9999.0 9999.0 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                5.5  100.0    0.0 9999.0    8.8    0.4   12.8 9999.0

***** SHIP # 253 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                5.0  253.0    3.0   71.0  217.0 9999.0   31.6   13.1    0.0 9999.0   71.0   18.4  122.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
             9999.0   38.0    6.1 9999.0 9999.0    3.0    1.0   12.8    0.0 9999.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               16.3 9999.0   35.0    5.9 9999.0    4.7 9999.0
               16.3 9999.0  -35.0    6.3 9999.0 9999.0 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               16.3  100.0    0.0 9999.0   23.5 9999.0    8.5 9999.0

***** SHIP # 254 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                5.0  254.0    2.0  114.0  240.0 9999.0   38.0   15.1    0.0 9999.0  114.0   20.7  119.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
             9999.0   53.0    6.5 9999.0 9999.0    3.0    1.0   17.3    0.0 9999.0 9999.0
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      TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                15.8 9999.0   35.0    8.2 9999.0    8.2 9999.0
                15.8 9999.0  -35.0    9.2 9999.0 9999.0 9999.0

     STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                15.7  100.0    0.0 9999.0   23.8    1.8   15.3 9999.0


***** SHIP # 255 *****

    DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 5.0  255.0    1.0   34.0  216.0 9999.0   31.1    6.3   48.0 9999.0 9999.0   17.6  119.0

 RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
              9999.0   33.0    6.2 9999.0 9999.0    3.0    1.0   26.4    0.0 9999.0 9999.0

      TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                17.4 9999.0   35.0    6.6 9999.0    5.8 9999.0
                17.4 9999.0  -35.0    6.3 9999.0 9999.0 9999.0

     STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                17.5  100.0    0.0 9999.0   24.4    0.5    9.6 9999.0


***** SHIP # 256 *****

    DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 5.0  256.0 9999.0   34.0  236.0 9999.0   31.8    5.7  101.0 9999.0 9999.0   15.0  122.0

 RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
              9999.0   40.0    6.0 9999.0 9999.0    3.0    1.0   33.2    0.0 9999.0 9999.0

      TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                16.5 9999.0   35.0    9.6 9999.0    8.2 9999.0
                16.5 9999.0  -35.0    9.3 9999.0 9999.0 9999.0


***** SHIP # 257 *****

    DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 5.0  257.0    2.0  122.0  252.0 9999.0   38.0   15.0    0.0 9999.0  121.0   27.3  100.0

 RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
              9999.0   53.0    7.5 9999.0 9999.0    1.0    1.0   19.6    0.0 9999.0 9999.0

      TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                17.2 9999.0   35.0    9.1 9999.0    9.2 9999.0
                17.2 9999.0  -35.0    9.9 9999.0 9999.0 9999.0

     STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                17.3  100.0    0.0 9999.0   41.4 9999.0   15.1 9999.0


***** SHIP # 258 *****

    DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 5.0  258.0    1.0   55.0  238.0 9999.0   36.6    7.9   28.0 9999.0 9999.0   20.7  114.0

 RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
              9999.0   55.0    6.7 9999.0 9999.0    3.0    1.0   30.4    0.0 9999.0 9999.0

      TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                16.7 9999.0   35.0    6.9 9999.0    4.0 9999.0
                16.7 9999.0  -35.0    7.5 9999.0    5.6 9999.0
                12.2 9999.0   35.0    6.9 9999.0    4.4 9999.0
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              12.2 9999.0  -35.0    7.0 9999.0    4.6 9999.0

     STOPPING SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
              16.7  100.0    0.0 9999.0   26.2 9999.0   10.5 9999.0

  ***** SHIP # 259 *****

    DIMENSION NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
               5.0  259.0    2.0  370.0  330.0 9999.0   53.3   24.1    1.0 9999.0  370.0   37.4   93.0

 RUDDER, PROP SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
            9999.0  159.0    7.2   12.8 9999.0    1.0    4.0   29.3    0.0 9999.0 9999.0

      TURNING SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
              14.6 9999.0   35.0    8.4 9999.0    8.6 9999.0
              14.6 9999.0  -35.0    9.4 9999.0    9.4 9999.0

     STOPPING SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
              14.8  100.0    0.0 9999.0   18.9   17.0   17.0 9999.0

  ***** SHIP # 260 *****

    DIMENSION NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
               3.0  260.0    4.0  113.0  254.0 9999.0   39.9   13.4    0.0 9999.0  113.0   19.0   90.0

 RUDDER, PROP SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
            9999.0   63.0    7.5    9.0 9999.0    1.0    1.0   22.0    0.0 9999.0 9999.0

      TURNING SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
              16.2 9999.0   35.0    7.7 9999.0 9999.0 9999.0
              16.2 9999.0  -35.0    7.9 9999.0 9999.0 9999.0

     STOPPING SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
              16.3  100.0    0.0 9999.0   30.5   14.8   12.7 9999.0

  ***** SHIP # 261 *****

    DIMENSION NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
               5.0  261.0    2.0  312.0  318.0 9999.0   56.0   20.6 9999.0 9999.0  312.0   36.0   85.0

 RUDDER, PROP SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
            9999.0  111.0    8.9 9999.0 9999.0    1.0    1.0   21.7    0.0 9999.0 9999.0

      TURNING SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
              16.0 9999.0   35.0    9.8 9999.0    6.0 9999.0
              16.0 9999.0  -35.0    9.7 9999.0    6.6 9999.0

  ***** SHIP # 262 *****

    DIMENSION NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
               5.0  262.0    2.0  139.0  318.0 9999.0   56.0    9.6   41.0 9999.0  312.0   36.0   85.0

 RUDDER, PROP SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
            9999.0   89.0    8.9 9999.0 9999.0    1.0    1.0   56.5    0.0 9999.0 9999.0

      TURNING SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
              17.7 9999.0   35.0    8.6 9999.0    6.3 9999.0
              17.7 9999.0  -35.0    8.5 9999.0    6.6 9999.0

     STOPPING SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
              17.4  100.0    0.0 9999.0   44.6   19.5   17.3 9999.0
              16.9  100.0    0.0 9999.0   34.7    6.6   14.0 9999.0
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***** SHIP # 263 *****
   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                5.0  263.0    2.0  269.0  310.0 9999.0   54.0   19.4 9999.0 9999.0  269.0   36.0   85.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
             9999.0   98.0    8.8 9999.0 9999.0    1.0    1.0   24.7    0.0 9999.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               16.9 9999.0   35.0    9.1 9999.0    6.6 9999.0
               16.4 9999.0  -35.0    9.9 9999.0    7.0 9999.0

***** SHIP # 264 *****
   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                5.0  264.0    2.0  129.0  310.0 9999.0   54.0   10.0   37.0 9999.0  269.0   36.0   85.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
             9999.0   88.0    8.8 9999.0 9999.0    1.0    1.0   54.0    0.0 9999.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               17.9 9999.0   35.0    8.9 9999.0    7.0 9999.0
               17.9 9999.0  -35.0    8.6 9999.0    7.8 9999.0

***** SHIP # 265 *****
   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                5.0  265.0    1.0   39.0  162.0 9999.0   26.0   10.8    0.0 9999.0   39.0   11.2  119.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
             9999.0   28.0    5.8 9999.0 9999.0    2.0    1.0    7.7    0.0 9999.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               15.0 9999.0   35.0    5.0 9999.0    4.4 9999.0
               14.4 9999.0  -35.0    5.0 9999.0    3.4 9999.0

     ZIG-ZAG   SPDZ   RUDZ   OVS1   OVSF   OVSW   KPRM   TPRM   PERD
               11.2   10.0   11.0 9999.0 9999.0    2.6    3.8 9999.0

***** SHIP # 266 *****
   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                5.0  266.0    1.0   20.0  162.0 9999.0   26.0    5.8   43.0 9999.0   39.0   11.2  119.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
             9999.0   23.0    5.8 9999.0 9999.0    2.0    1.0   15.8    0.0 9999.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               16.2 9999.0   35.0    5.0 9999.0    3.7 9999.0
               16.2 9999.0  -35.0    5.4 9999.0    3.2 9999.0

     ZIG-ZAG   SPDZ   RUDZ   OVS1   OVSF   OVSW   KPRM   TPRM   PERD
               10.8   10.0    5.0 9999.0 9999.0    1.5 [illegible].4 9999.0

***** SHIP # 267 *****
   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                5.0  267.0    2.0  478.0  360.0 9999.0   69.0   22.8    0.0 9999.0  478.0   45.0   80.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
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          9999.0  162.0     9.8 9999.0 9999.0    1.0     1.0    24.9     0.0 9999.0 9999.0
   TURNING  SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
            16.0 9999.0   35.0   10.8 9999.0    5.7 9999.0
            16.1 9999.0  -35.0   11.1 9999.0    6.2 9999.0

***** SHIP # 268 *****

  DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
               5.0  268.0    2.0  216.0  360.0 9999.0   69.0   11.0   35.0 9999.0  478.0   45.0   80.0
RUDDER, PROP  SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
            9999.0  162.0    9.8 9999.0 9999.0    1.0    1.0   67.4    0.0 9999.0 9999.0
   TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
              17.5 9999.0   35.0    9.3 9999.0    7.0 9999.0
              17.8 9999.0  -35.0    9.7 9999.0    7.4 9999.0

***** SHIP # 269 *****

  DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
               5.0  269.0    2.0  267.0  306.0 9999.0   53.0   19.5    0.0 9999.0  267.0   36.0   90.0
RUDDER, PROP  SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
            9999.0   99.0    8.6 9999.0 9999.0    1.0    1.0   20.8    0.0 9999.0 9999.0
   TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
              16.5 9999.0   35.0    8.6 9999.0    6.8 9999.0
              16.5 9999.0  -35.0    9.6 9999.0    6.8 9999.0

***** SHIP # 270 *****

  DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
               5.0  270.0    2.0  120.0  306.0 9999.0   53.0    9.4   35.0 9999.0  267.0   36.0   90.0
RUDDER, PROP  SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
            9999.0   99.0    8.6 9999.0 9999.0    1.0    1.0   51.5    0.0 9999.0 9999.0
   TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
              17.2 9999.0   35.0    9.6 9999.0    6.2 9999.0
              17.2 9999.0  -35.0    8.6 9999.0    5.4 9999.0

***** SHIP # 271 *****

  DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
               5.0  271.0    2.0  268.0  306.0 9999.0   53.0   19.6    0.0 9999.0  268.0   36.0   90.0
RUDDER, PROP  SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
            9999.0   99.0    8.6 9999.0 9999.0    1.0    1.0   20.4    0.0 9999.0 9999.0
   TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
              17.0 9999.0   35.0    9.0 9999.0    6.5 9999.0
              17.0 9999.0  -35.0    9.2 9999.0    7.0 9999.0
   ZIG-ZAG    SPDZ   RUDZ   OVS1   OVSF   OVSW   KPRM   TPRM   PERD
              16.6   15.0   25.0 9999.0 9999.0    2.6    7.7 9999.0
              16.3   15.0   25.0 9999.0 9999.0    3.1    8.6 9999.0

***** SHIP # 272 *****

  DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
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                  5.0  272.0    2.0  118.0  304.0 9999.0   53.0    9.4   35.0 9999.0  268.0   36.0   94.0

 RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
              9999.0   99.0    8.6 9999.0 9999.0    1.0    1.0   51.5    0.0 9999.0 9999.0

      TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                10.2 9999.0   35.0    8.6 9999.0    6.4 9999.0
                10.3 9999.0  -35.0    8.6 9999.0    6.2 9999.0

 ***** SHIP # 273 *****

    DIMENSION   NATN   NNBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   BRIS   SSHP   SRPM
                 5.0  273.0    5.0   32.0  248.0 9999.0   33.2   11.0    0.0 9999.0   57.4   80.0  110.0

 RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
              9999.0   58.0    7.0 9999.0 9999.0    3.0    3.0   24.5    0.0 9999.0 9999.0

      ZIG-ZAG   SPDZ   RUDZ   OVS1   OVSF   OVSW   RPRN   TPRN   PERD
              9999.0    5.0    8.0 9999.0 9999.0    2.0    4.5 9999.0
              9999.0   10.0    6.0 9999.0 9999.0    1.3    2.2 9999.0
              9999.0   15.0    5.0 9999.0 9999.0    1.0    1.8 9999.0
              9999.0   15.0    5.0 9999.0 9999.0    1.0    1.8 9999.0

 ***** SHIP # 274 *****

    DIMENSION   NATN   NNBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   BRIS   SSHP   SRPM
                 5.0  274.0    5.0   32.0  248.0 9999.0   33.2    7.5   30.0 9999.0   57.4   80.0  110.0

 RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
              9999.0   58.0    7.0 9999.0 9999.0    3.0    3.0   33.3    0.0 9999.0 9999.0

      ZIG-ZAG   SPDZ   RUDZ   OVS1   OVSF   OVSW   RPRN   TPRN   PERD
              9999.0    5.0    2.0 9999.0 9999.0    1.0    1.2 9999.0
              9999.0    5.0    2.0 9999.0 9999.0    1.4    1.5 9999.0
              9999.0   10.0    3.0 9999.0 9999.0    0.8    1.2 9999.0
              9999.0   10.0    2.0 9999.0 9999.0    0.9    0.9 9999.0
              9999.0   15.0    2.0 9999.0 9999.0    0.7    0.8 9999.0
              9999.0   15.0    3.0 9999.0 9999.0    0.7    0.8 9999.0

 ***** SHIP # 275 *****

    DIMENSION   NATN   NNBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   BRIS   SSHP   SRPM
                 5.0  275.0    5.0    8.0  179.0 9999.0   22.4    4.3   41.0 9999.0 9999.0    8.0  155.0

 RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
              9999.0   14.0    4.9    3.7 9999.0    3.0    1.0    9.4    0.0 9999.0 9999.0

      TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                10.5 9999.0   35.0    4.3 9999.0    2.9 9999.0
                10.0 9999.0  -35.0    4.3 9999.0    3.3 9999.0

     STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                17.2  100.0    0.0 9999.0   10.4    0.6    3.6 9999.0

 ***** SHIP # 276 *****

    DIMENSION   NATN   NNBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   BRIS   SSHP   SRPM
                 5.0  276.0    3.0   22.0  178.0 9999.0   28.4    5.6   57.0 9999.0 9999.0    9.9  150.0

 RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
              9999.0   30.0    5.2    4.2 9999.0    3.0    1.0   19.1    0.0 9999.0 9999.0
     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               15.8 9999.0   35.0    5.4 9999.0    3.9 9999.0
               15.8 9999.0  -35.0    5.3 9999.0    4.0 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TINS   TIMR
               15.8  100.0    0.0 9999.0   13.2    0.2    5.5 9999.0

***** SHIP # 277 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                5.0  277.0    2.0  283.0  320.0 9999.0   54.5   19.2    0.0 9999.0  283.0   40.0   83.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
             9999.0  110.0    9.4   16.9 9999.0    1.0    1.0   24.8    0.0 9999.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               17.1 9999.0   35.0    9.5 9999.0    7.3 9999.0
               17.1 9999.0  -35.0    9.8 9999.0    7.8 9999.0

   STOPPING .  SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TINS   TIMR
               17.9  100.0    0.0 9999.0   44.0   20.8   18.0 9999.0

***** SHIP # 278 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                5.0  278.0    2.0  132.0  320.0 9999.0   54.5    9.6   74.0 9999.0  283.0   45.0   90.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
             9999.0  108.0    9.4   16.9 9999.0    1.0    1.0   35.8    0.0 9999.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               18.2 9999.0   35.0    9.2 9999.0    7.7 9999.0
               18.2 9999.0  -35.0    9.2 9999.0    8.5 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TINS   TIMR
               18.8  100.0    0.0 9999.0   35.1    4.5   12.6 9999.0

***** SHIP # 279 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                5.0  279.0    2.0  548.0  360.0 9999.0   54.5   28.1    0.0 9999.0  548.0   45.0   90.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
             9999.0  148.0    9.2   19.0 9999.0    1.0    1.0   32.0    0.0 9999.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               15.0 9999.0   35.0   10.6 9999.0    8.8 9999.0
               15.2 9999.0  -35.0   11.1 9999.0    9.5 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TINS   TIMR
               17.6  100.0    0.0 9999.0   47.5    7.2   18.5 9999.0

***** SHIP # 280 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                5.0  280.0    2.0  424.0  330.0 9999.0   54.5   27.1    0.0 9999.0  424.0   45.0   90.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
             9999.0  148.0    9.0   19.0 9999.0    1.0    1.0   29.4    0.0 9999.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               15.7 9999.0   35.0   10.1 9999.0    8.3 9999.0
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                    15.7  9999.0   -35.0    10.1  9999.0     8.2  9999.0

        STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TINS    TIMR
                    15.6   100.0     0.0  9999.0    52.9    16.8    22.7  9999.0

    ***** SHIP # 201 *****

       DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                     5.0   281.0     2.0   149.0   330.0  9999.0    54.5    10.4    53.0  9999.0   424.0    45.0    90.0

    RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  9999.0   131.0     9.0    19.0  9999.0     1.0     1.0    84.5     0.0  9999.0  9999.0

         TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                    17.7  9999.0    35.0     8.9  9999.0     6.4  9999.0
                    17.7  9999.0   -35.0     8.8  9999.0     6.6  9999.0

        STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TINS    TIMR
                    17.7   100.0     0.0  9999.0    34.3     0.2    13.2  9999.0

    ***** SHIP # 202 *****

       DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                     8.0   282.0     2.0   134.0   274.0   280.0    39.0    15.4     2.0     0.0   134.0    25.0   105.0

    RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                    15.5    58.0     7.4    13.8     1.0     1.0     1.0  9999.0  9999.0     4.0  9999.0

         TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  9999.0  9999.0    35.0     8.9     9.2    14.0  9999.0
                  9999.0  9999.0   -35.0     8.7     5.6    10.8  9999.0

        STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TINS    TIMR
                  9999.0   100.0     0.0  9999.0    34.4     9.6    19.0    60.0

    ***** SHIP # 203 *****

       DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                     8.0   283.0     2.0    59.0   274.0   280.0    39.0     7.3    22.0     0.0   134.0    25.0   105.0

    RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                    17.0    39.0     7.4    13.8     1.0     1.0     1.0  9999.0  9999.0     1.0  9999.0

         TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  9999.0  9999.0    35.0    10.0    10.4    16.0  9999.0
                  9999.0  9999.0   -35.0     9.0    10.4    16.0  9999.0

        STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TINS    TIMR
                  9999.0   100.0     0.0  9999.0    30.8     4.0    15.5    60.0

    ***** SHIP # 204 *****

       DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                     8.0   284.0     1.0    66.0   221.0   232.0    30.6    12.4     0.0     0.0    66.0    16.0   105.0

    RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                    14.5    38.0     6.4     9.6     1.0     1.0     1.0  9999.0  9999.0     5.0  9999.0

         TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  9999.0  9999.0    35.0     7.5     7.5    11.5  9999.0
                  9999.0  9999.0   -35.0     6.5     7.5    12.0  9999.0
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     STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 15.5   100.0     0.0  9999.0    19.8     3.2    10.5    10.0

  ***** SHIP # 285 *****

    DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  8.0   285.0     1.0    69.0   225.0   236.0    32.2    11.6     0.0     0.0    69.0    18.2   121.5

 RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    EHGN    PROP    LATA    LCAX    WHWV    TRLC
                 16.0    41.0     6.4     7.2     1.0     3.0     1.0  9999.0  9999.0     1.0  9999.0

      TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 15.4  9999.0    35.0     6.6     3.7     6.8  9999.0
                 15.4  9999.0   -35.0     6.9     4.0     7.2  9999.0

     STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 15.8   100.0     0.0  9999.0    28.6    13.7    11.3    11.0

  ***** SHIP # 286 *****

    DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  8.0   286.0     3.0    87.0   229.0  24[illegible]  [illegible]    12.8     0.0  9999.0    87.0    19.0   124.2

 RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    E[illegible]  [illegible]OP    LATA    LCAX    WHWV    TRLC
                 15.0    47.0     6.2  9999.0     1.0  [illegible]     1.0  9999.0  9999.0     1.0  9999.0

      TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 15.5  9999.0    35.0     6.8     4.3     7.6  9999.0
                 15.5  9999.0   -35.0     6.7     4.0     7.2  9999.0

     STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 15.8   100.0     0.0  9999.0    22.0    10.4     8.3    11.0

  ***** SHIP # 287 *****

    DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  5.0   287.0     3.0    68.0   220.0  9999.0    31.1    11.6     0.0     0.0    68.0    13.4   105.0

 RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    EHGN    PROP    LATA    LCAX    WHWV    TRLC
                 15.0    33.0     6.6     5.4  9999.0     1.0     1.0    12.0     0.0     4.0  9999.0

      TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 15.2  9999.0    35.0     6.5     3.5     6.1  9999.0
                 15.4  9999.0   -35.0     7.3     3.7     7.0  9999.0

     STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 14.5   100.0     0.0  9999.0    22.6    11.5     9.0  9999.0

      ZIG-ZAG    SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                 15.4    10.0     6.0    15.0  9999.0  9999.0  9999.0  9999.0

  ***** SHIP # 288 *****

    DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  5.0   288.0     1.0    87.0   223.0   236.0    37.2    12.5     0.0  9999.0    87.0    20.7   119.0

 RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    EHGN    PROP    LATA    LCAX    WHWV    TRLC
                 15.6    44.0     6.4  9999.0  9999.0     3.0     1.0    14.0     0.0     4.0  9999.0

      TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 16.0  9999.0    35.0     7.1     3.8     7.0  9999.0
                 16.0  9999.0   -35.0     7.2     4.0     7.3  9999.0
      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  16.1   100.0     0.0  9999.0    22.5    11.2     9.2  9999.0

       ZIG-ZAG    SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                  15.0    10.0     7.0    22.0  9999.0  9999.0  9999.0  9999.0

 ***** SHIP # 289 *****

     DIMENSION    NATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0   289.0     2.0   134.0   256.0   270.0    42.5    14.9     0.0  9999.0   134.0    24.0   105.0

 RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  16.6    57.0     7.2     8.8  9999.0     1.0     1.0    17.2     0.0     1.0  9999.0

       TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  16.1  9999.0    35.0     8.1     6.3     9.3  9999.0
                  16.1  9999.0   -35.0     9.0     5.0     8.8  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  16.1   100.0     0.0  9999.0    35.8     4.0    12.6  9999.0

       ZIG-ZAG    SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                  16.1    15.0    15.0    21.0  9999.0  9999.0  9999.0  9999.0

 ***** SHIP # 290 *****

     DIMENSION    NATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0   290.0     2.0   143.0   256.0   270.0    42.5    15.7     0.0  9999.0   143.0    24.0   105.0

 RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  16.0    63.0     7.2     8.8  9999.0     1.0     1.0    18.7     0.0     4.0  9999.0

       TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  15.5  9999.0    35.0     8.2     4.6     8.2  9999.0
                  15.5  9999.0   -35.0     8.0     4.5     8.4  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  15.5   100.0     0.0  9999.0    31.4    15.4    14.1  9999.0

       ZIG-ZAG    SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                  13.0     9.0     6.0    16.0  9999.0  9999.0  9999.0  9999.0

 ***** SHIP # 291 *****

     DIMENSION    NATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0   291.0     2.0    71.0   300.0   270.0    42.5     8.3    24.0  9999.0   143.0    24.0   105.0

 RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                9979.0    63.0     7.2     8.8  9999.0     1.0     1.0    37.6     0.0     1.0  9999.0

       TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  17.8  9999.0    35.0     8.0     4.5     7.7  9999.0
                  17.8  9999.0   -35.0     7.9     4.8     8.3  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  17.7   100.0     0.0  9999.0    29.7     5.0    11.0  9999.0

 ***** SHIP # 292 *****

     DIMENSION    NATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0   292.0     2.0   243.0   300.0   316.0    50.0    18.9     0.0  9999.0   243.0    36.0    90.0
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RUDDER, PROP      SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  16.2    92.0     8.6    13.0  9999.0     1.0     1.0    27.3     0.0     1.0  9999.0

     TURNING      SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  16.7  9999.0    35.0     8.9     4.8     8.5  9999.0
                  16.7  9999.0   -35.0     9.2     4.8     8.9  9999.0

    STOPPING      SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  16.7   100.0     0.0  9999.0    45.0    22.6    19.0  9999.0

     ZIG-ZAG      SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                  15.7    10.0    10.0    24.0  9999.0  9999.0  9999.0  9999.0

***** SHIP # 293 *****

   DIMENSION      NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0   293.0     2.0   114.0   310.0   316.0    50.0     9.4    51.0  9999.0   243.0    36.0    90.0

RUDDER, PROP      SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                9999.0    92.0     8.6    13.0  9999.0     1.0     1.0    55.8     0.0     1.0  9999.0

     TURNING      SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  18.3  9999.0    35.0     8.8     4.8     8.9  9999.0
                  18.3  9999.0   -35.0     8.6     4.7     8.6  9999.0

    STOPPING      SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  18.3   100.0     0.0  9999.0    36.4     1.2    12.0  9999.0

***** SHIP # 294 *****

   DIMENSION      NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0   294.0     2.0   244.0   310.0   325.0    47.2    18.9     0.0  9999.0   244.0    28.0    85.0

RUDDER, PROP      SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  16.0    75.0     8.8    13.0     1.0     1.0     1.0    20.5     0.0     1.0  9999.0

     TURNING      SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  15.4  9999.0    35.0    10.8     6.5    12.8  9999.0
                  15.4  9999.0   -35.0    10.8     6.7    12.8  9999.0

    STOPPING      SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  15.9   100.0     0.0  9999.0    49.1     6.8    22.1  9999.0

     ZIG-ZAG      SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                  15.8    36.0    14.0     8.0  9999.0  9999.0  9999.0  9999.0

***** SHIP # 295 *****

   DIMENSION      NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0   295.0     1.0    83.0   232.0   244.0    35.8    12.1     0.0     0.0    83.0    20.7   114.0

RUDDER, PROP      SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  16.1    43.0     6.8    10.4     1.0     3.0     1.0    13.3     0.0  9999.0  9999.0

     TURNING      SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  14.0  9999.0    35.0     7.4     4.8     8.3  9999.0
                  15.2  9999.0   -35.0     7.2     3.9     7.2  9999.0

    STOPPING      SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  17.4   100.0     0.0  9999.0    27.7  9999.0    10.1    16.0

     ZIG-ZAG      SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
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               9999.0    20.0    16.0    17.0  9999.0  9999.0  9999.0  9999.0
               9999.0    20.0    16.0    15.0  9999.0  9999.0  9999.0  9999.0

***** SHIP # 296 *****

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0   296.0     2.0   122.0   246.0   258.0    42.2    14.9     0.0  9999.0   122.0    23.0   114.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  15.4    35.0     6.8     7.4     1.0     3.0     1.0    19.4     0.0     1.0  9999.0

       TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  16.2  9999.0    36.0     7.2     4.4     7.9  9999.0
                  16.0  9999.0   -38.0     7.4     4.2     8.0  9999.0
                  10.0  9999.0    36.0     5.7     4.0     7.8  9999.0
                  10.0  9999.0   -35.0     6.7     4.2     8.1  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  16.6   100.0     0.0  9999.0    34.7    12.0    13.0    74.0

       ZIG-ZAG    SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                  16.8    10.0     5.0    12.0  9999.0  9999.0  9999.0  9999.0
                  16.8    10.0     6.0    17.0  9999.0  9999.0  9999.0  9999.0

***** SHIP # 297 *****

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0   297.0     2.0   143.0   265.0   278.0    44.2    15.1     0.0  9999.0   143.0    27.6   114.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  16.2    61.0     7.0    11.4     1.0     3.0     1.0    19.6     0.0     1.0  9999.0

       TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  16.6  9999.0    36.0     8.9     5.0     8.6  9999.0
                  16.6  9999.0   -37.0     9.4     4.8     8.8  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  16.0   100.0     0.0  9999.0    39.5  9999.0    14.0    31.0

       ZIG-ZAG    SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                  15.3    15.0    16.0    15.0  9999.0  9999.0  9999.0  9999.0
                  15.3    15.0    15.0    15.0  9999.0  9999.0  9999.0  9999.0

***** SHIP # 298 *****

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0   298.0     2.0   103.0   234.0   244.0    37.0    14.4     0.0  9999.0   103.0    20.7   114.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  15.8    45.0     6.6    11.4     1.0     3.0     1.0    15.0     0.0     1.0  9999.0

       TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  17.0  9999.0    35.0     7.9     7.9     7.5  9999.0
                  17.0  9999.0   -35.0     4.0     4.1     7.9  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  17.0   100.0     0.0  9999.0    33.3     5.9    11.5    43.0
                   8.9   100.0     0.0  9999.0     6.9     2.0     4.9    12.0

       ZIG-ZAG    SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                  16.0    10.0     6.0     7.0  9999.0  9999.0  9999.0  9999.0
                  16.0    10.0     4.0    11.0  9999.0  9999.0  9999.0  9999.0
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***** SHIP # 299 *****

   DIMENSION     NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  5.0  299.0    1.0   84.0  230.0  240.0   36.0   12.2    0.0 9999.0   84.0   18.4  114.0

RUDDER, PROP     SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                 15.8   40.0    6.5 9999.0    3.0    3.0    1.0   12.0    0.0    4.0 9999.0

     TURNING     SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 16.3 9999.0   35.0    5.9    4.1    7.1 9999.0
                 16.3 9999.0  -35.0    6.2    4.0    7.2 9999.0

     ZIG-ZAG     SPDZ   RUDZ   OVS1   OVSF   OVSW   KPRM   TPRM   PERD
                 16.3   10.0    7.0   17.0 9999.0 9999.0 9999.0 9999.0
                 16.3   10.0    8.0   25.0 9999.0 9999.0 9999.0 9999.0

***** SHIP # 326 *****

   DIMENSION     NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  5.0  326.0    1.0   92.0  235.0  246.0   37.6   12.6    0.0 9999.0   92.0   20.7  114.0

RUDDER, PROP     SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                 15.5   42.0    6.7 9999.0    3.0    3.0    1.0   15.0    0.0    4.0 9999.0

     TURNING     SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 13.6 9999.0   35.0    6.4    3.6    7.0 9999.0
                 14.6 9999.0  -35.0    6.4    3.7    6.7 9999.0

     ZIG-ZAG     SPDZ   RUDZ   OVS1   OVSF   OVSW   KPRM   TPRM   PERD
                 14.7   10.0    8.0   23.0 9999.0 9999.0 9999.0 9999.0
                 14.8   10.0    7.0   16.0 9999.0 9999.0 9999.0 9999.0

***** SHIP # 327 *****

   DIMENSION     NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  5.0  327.0    2.0  126.0  246.0  257.0   39.4   15.5    0.0 9999.0  126.0   23.0  114.0

RUDDER, PROP     SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                 15.4   54.0    6.9 9999.0    3.0    3.0    1.0   19.2    0.0    1.0 9999.0

     TURNING     SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 16.2 9999.0  -35.0    7.1    4.4    7.9 9999.0
                 16.2 9999.0  -35.0    7.2    4.5    8.0 9999.0

     ZIG-ZAG     SPDZ   RUDZ   OVS1   OVSF   OVSW   KPRM   TPRM   PERD
                 14.8   10.0   10.0   21.0 9999.0 9999.0 9999.0 9999.0
                 15.4   10.0   10.0   19.0 9999.0 9999.0 9999.0 9999.0

***** SHIP # 328 *****

   DIMENSION     NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  5.0  328.0    2.0  158.0  280.0  293.0   44.0   13.6    0.0 9999.0  158.0   27.6  114.0

RUDDER, PROP     SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                 16.0   45.0    7.1 9999.0    3.0    3.0    1.0   24.9    0.0    7.0 9999.0

     TURNING     SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 12.5 9999.0   35.0    6.4    4.5    8.4 9999.0
                 14.9 9999.0  -35.0    7.3    5.2    9.9 9999.0

     ZIG-ZAG     SPDZ   RUDZ   OVS1   OVSF   OVSW   KPRM   TPRM   PERD
                 11.8   10.0    9.0   15.0 9999.0 9999.0 9999.0 9999.0
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          11.0    10.0    14.0    17.0  9999.0  9999.0  9999.0  9999.0

***** SHIP # 329 *****

  DIMENSION   NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
               5.0   329.0     2.0    82.0   280.0   293.0    44.0     8.5     0.0  9999.0   158.0    27.6   114.0

RUDDER, PROP  SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
              17.1    40.0     7.1  9999.0     3.0     3.0     1.0    44.8     0.0     7.0  9999.0

    TURNING   SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
              14.6  9999.0    35.0     7.0     3.7     6.8  9999.0

***** SHIP # 330 *****

  DIMENSION   NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
               5.0   330.0     2.0   174.0   304.0   316.0    44.0    16.0     0.0  9999.0   174.0    27.6   114.0

RUDDER, PROP  SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
              16.0    45.0     7.1  9999.0     3.0     3.0     1.0    28.0     0.0     4.0  9999.0

    TURNING   SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
              15.8  9999.0    35.0     9.5     5.3     9.5  9999.0
              16.0  9999.0   -35.0     8.8     5.1     9.0  9999.0

    ZIG-ZAG   SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
              16.0    10.0    12.0    18.0  9999.0  9999.0  9999.0  9999.0
              16.0    10.0     6.0    13.0  9999.0  9999.0  9999.0  9999.0

***** SHIP # 331 *****

  DIMENSION   NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
               5.0   331.0     2.0    86.0   304.0   316.0    44.0     7.6    23.0  9999.0   174.0    27.6   114.0

RUDDER, PROP  SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
              17.1    40.0     7.1  9999.0     3.0     3.0     1.0    53.6     0.0     4.0  9999.0

    TURNING   SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
              17.4  9999.0    35.0     9.8     5.8    11.1  9999.0
              17.2  9999.0   -35.0     8.8     4.9     8.3  9999.0

    ZIG-ZAG   SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
              17.0    10.0     6.0     6.0  9999.0  9999.0  9999.0  9999.0
              17.0    10.0     4.0     4.0  9999.0  9999.0  9999.0  9999.0

***** SHIP # 332 *****

  DIMENSION   NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
               5.0   332.0     1.0    91.0   232.0   242.0    37.1    12.4     0.0  9999.0    91.0    20.7   119.0

RUDDER, PROP  SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
              15.7    42.0     6.4  9999.0     3.0     3.0     1.0    15.3     0.0     1.0  9999.0

    TURNING   SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
              16.2  9999.0    35.0     7.2     4.5     8.2  9999.0
              16.2  9999.0   -35.0     6.6     3.5     7.2  9999.0

   STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
              16.5   100.0     0.0  9999.0    25.0     3.8     9.6    35.0

***** SHIP # 333 *****
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     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0   333.0     1.0    70.0   224.0   236.0    32.2    11.4     1.0  9999.0    70.0    17.6   119.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  15.8    38.0     6.1  9999.0     3.0     3.0     1.0    12.6     0.0     1.0  9999.0

       TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  15.8  9999.0    35.0     6.4     3.6     6.8  9999.0
                  15.8  9999.0   -35.0     6.8     4.1     7.8  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  15.8   100.0     0.0  9999.0    24.2  9999.0     8.2    25.0

       ZIG-ZAG    SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                  16.1    20.0    10.0    13.0  9999.0  9999.0  9999.0  9999.0


 ***** SHIP # 334 *****

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0   334.0     3.0    33.0   223.0   235.0    31.8     5.8    41.0  9999.0    33.0    16.0   122.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  15.6    37.0     6.0  9999.0     3.0     3.0     1.0    29.4     0.0     1.0  9999.0

       TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  16.3  9999.0    35.0     7.5     3.9     6.9  9999.0
                  16.3  9999.0   -35.0     7.6     4.0     7.6  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  16.3   100.0     0.0  9999.0    19.1     2.4     7.8    35.0

       ZIG-ZAG    SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                  17.4    35.0    13.0    11.0  9999.0  9999.0  9999.0  9999.0


 ***** SHIP # 335 *****

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0   335.0     3.0    46.0   237.0   249.0    38.5     6.4    35.0  9999.0    46.0    20.7   119.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  15.4    49.0     6.4  9999.0     3.0     3.0     1.0    32.9     0.0     1.0  9999.0

       TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  17.0  9999.0    36.0     7.9     3.6     7.2  9999.0
                  17.0  9999.0   -36.0     7.2     3.8     7.1  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  17.0   100.0     0.0  9999.0    23.1  9999.0     8.5    30.0


 ***** SHIP # 336 *****

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0   336.0     2.0   244.0   326.0   344.0    49.8    17.6     2.0  9999.0   244.0    33.0   101.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  16.4    91.0     7.8  9999.0     3.0     1.0     1.0    21.5     0.0     1.0  9999.0

       TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  16.4  9999.0    35.0     9.8     6.2    11.0  9999.0
                  15.5  9999.0   -35.0     9.2     5.4     9.8  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
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                    16.6   100.0     0.0  9999.0    35.1    26.4    21.0    84.0

         ZIG-ZAG    SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                    15.0    10.0     6.0    14.0  9999.0  9999.0  9999.0  9999.0

   ***** SHIP # 337 *****

       DIMENSION    MATN    MMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                     5.0   337.0     2.0   104.0   326.0   344.0    49.8     8.0    42.0  9999.0   244.0    33.0   101.0

    RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  9999.0    91.0     7.8  9999.0     3.0     1.0     1.0    52.8     0.0     8.0  9999.0

         ZIG-ZAG    SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                    16.8    10.0     4.0     4.0  9999.0  9999.0  9999.0  9999.0

   ***** SHIP # 338 *****

       DIMENSION    MATN    MMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                     5.0   338.0     2.0   161.0   240.0   274.0    43.5    17.0     1.0  9999.0   161.0    23.0   122.0

    RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                    14.8    70.0     6.6  9999.0     3.0     3.0     1.0    17.7     0.0     1.0  9999.0

         TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                    15.3  9999.0    35.0     8.4     4.2     8.1  9999.0
                    15.4  9999.0   -35.0     9.1     5.5     9.9  9999.0

        STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                    15.5   100.0     0.0  9999.0    29.0    19.0    16.4    12.0

         ZIG-ZAG    SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                    15.5    10.0     7.0    15.0  9999.0  9999.0  9999.0  9999.0

   ***** SHIP # 339 *****

       DIMENSION    MATN    MMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                     5.0   339.0     2.0   112.0   245.0   274.0    38.9    13.0     3.0  9999.0   112.0    22.0    82.0

    RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                    14.2    49.0     8.0  9999.0     3.0     1.0     1.0    18.3     0.0     4.0  9999.0

         TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                    16.3  9999.0    35.0     9.0     5.3    .9.3  9999.0
                    16.5  9999.0   -36.0     8.5     4.3     8.0  9999.0

        STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                    16.2   100.0     0.0  9999.0    26.5     9.1    13.0    50.0

         ZIG-ZAG    SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                    17.0    20.0    14.0    15.0  9999.0  9999.0  9999.0  9999.0

   ***** SHIP # 340 *****

       DIMENSION    MATN    MMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                     5.0   340.0     1.0    78.0   220.0   232.0    35.0    12.1     1.0  9999.0    78.0    20.7   119.0

    RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                    16.2    40.0     6.5  9999.0     3.0     3.0     1.0    14.3     0.0     1.0  9999.0

         TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                    17.1  9999.0    36.0     8.3     4.5     8.1  9999.0
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               17.1 9999.0  -35.0    8.5    4.7    8.4 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               17.3  100.0    0.0 9999.0   25.4   32.0   10.0   19.0

     ZIG-ZAG   SPDZ   RUDZ   OVS1   OVSF   OVSW   KPRM   TPRM   PERD
               16.0   10.0    6.0   18.0 9999.0 9999.0 9999.0 9999.0


  ***** SHIP # 341 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                5.0  341.0    2.0  208.0  313.0  318.0   48.2   16.5    0.0 9999.0  208.0   28.0   90.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               16.0   98.0    8.1 9999.0    5.0    1.0    1.0   27.9    0.0    1.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               16.3 9999.0   35.0    9.0    6.0   10.6 9999.0
               16.0 9999.0  -35.0    9.9    6.8   10.5 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               15.8  100.0    0.0 9999.0   40.0 9999.0   16.0   23.0

     ZIG-ZAG   SPDZ   RUDZ   OVS1   OVSF   OVSW   KPRM   TPRM   PERD
             9999.0   10.0    8.0   24.0 9999.0 9999.0 9999.0 9999.0


  ***** SHIP # 342 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                5.0  342.0    2.0  180.0  281.0  294.0   46.2   16.5    0.0 9999.0  180.0   28.0   85.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               16.1   72.0    8.2 9999.0    3.0    1.0    1.0   26.7    0.0    1.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               16.0 9999.0   35.0    9.9    6.0   11.0 9999.0
               16.0 9999.0  -35.0    9.7    5.2    9.3 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               17.0  100.0    0.0 9999.0   42.0 9999.0   14.2   34.0


  ***** SHIP # 343 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                5.0  343.0    2.0  119.0  257.0  271.0   38.8   14.8    0.0    0.0  119.0   28.0  109.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               17.1   54.0    7.2 9999.0    3.0    1.0    1.0   14.9    0.0    4.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               17.6 9999.0   35.0    8.1 9999.0    7.8 9999.0
               17.5 9999.0  -35.0    8.8 9999.0    8.4 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               17.9  100.0    0.0 9999.0   35.3 9999.0   12.6   33.0

     ZIG-ZAG   SPDZ   RUDZ   OVS1   OVSF   OVSW   KPRM   TPRM   PERD
             9999.0   10.0   10.0   22.0 9999.0 9999.0 9999.0 9999.0

  ***** SHIP # 344 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
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BEST DOCUMENT AVAILABLE

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                5.0  344.0    1.0   68.0  216.0  227.0   33.4   11.4    2.0 9999.0   68.0   18.4  119.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               16.2   35.0    6.5 9999.0    3.0 9999.0    1.0   12.5    0.0    1.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               17.1 9999.0   35.0    8.4 9999.0    8.4 9999.0
               17.1 9999.0  -35.0    7.5 9999.0    7.9 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TINS   TIMR
               17.1  100.0    0.0 9999.0    7.5 9999.0    8.4   12.0

     ZIG-ZAG   SPDZ   RUDZ   OVS1   OVSF   OVSW   KPRM   TPRM   PERD
             9999.0   10.0    7.0   14.0 9999.0 9999.0 9999.0 9999.0

***** SHIP # 345 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                5.0  345.0    2.0  123.0  245.0  258.0   40.0   15.1    0.0 9999.0  123.0   24.0  110.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               16.2   53.0    6.9    9.6    3.0    1.0    1.0   15.9    0.0    1.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               14.5 9999.0   35.0    7.0    3.2    7.0 9999.0
               14.0 9999.0  -35.0    6.8    2.9    7.8 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TINS   TIMR
               16.6  100.0    0.0 9999.0   40.3   16.3   13.9   86.0

***** SHIP # 346 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                5.0  346.0    2.0  125.0  262.0  276.0   41.4   13.9    0.0 9999.0  125.0   23.8  104.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               17.0   50.0    7.0   11.6    2.0    1.0    1.0   16.5    0.0    1.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               17.1 9999.0   35.0    7.9    3.0    8.6 9999.0
               17.2 9999.0  -35.0    8.7    3.7    9.4 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TINS   TIMR
               17.2  100.0    0.0 9999.0   31.6 9999.0   13.7   58.0

     ZIG-ZAG   SPDZ   RUDZ   OVS1   OVSF   OVSW   KPRM   TPRM   PERD
               16.2   20.0   17.0   14.0 9999.0 9999.0 9999.0 9999.0

***** SHIP # 347 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                5.0  347.0    1.0   72.0  230.0  242.0   32.2   11.3    4.0 9999.0   72.0   18.4  115.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               15.9   40.0    6.6 9999.0 9999.0    3.0    1.0   21.2    0.0    4.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               13.2 9999.0   35.0    6.9    3.4    7.9 9999.0
               13.4 9999.0  -35.0    7.1    3.3    7.4 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TINS   TIMR
               15.8  100.0    0.0 9999.0   33.3    2.2   11.5  250.0
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      ZIG-ZAG     SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                  15.9    20.0    14.0    15.0  9999.0  9999.0  9999.0  9999.0

  ***** SHIP # 340 *****

      DIMENSION   MATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0   340.0     2.0   140.0   260.0   273.0    42.0    15.5     0.0  9999.0   140.0    24.2   115.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  15.6    63.0     6.7  9999.0     3.0     3.0     1.0    22.9     0.0     1.0  9999.0

        TURNING   SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  15.0  9999.0    35.0     7.9     3.1     8.4  9999.0
                  15.5  9999.0   -36.0     8.6     3.8     8.3  9999.0

       STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  16.3   100.0     0.0  9999.0    41.2     7.0    14.7   264.0

        ZIG-ZAG   SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                  15.6    10.0     7.0    19.0  9999.0  9999.0  9999.0  9999.0

  ***** SHIP # 349 *****

      DIMENSION   MATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0   349.0     2.0   215.0   302.0   317.0    50.4    17.1     0.0  9999.0   215.0    34.0    94.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  16.9    85.0     8.2    13.6     3.0     1.0     1.0    22.3     0.0     4.0  9999.0

        TURNING   SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  17.2  9999.0    35.0     9.6     4.0     9.5  9999.0
                  17.3  9999.0   -35.0     8.9     3.7     9.0  9999.0

       STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  17.3   100.0     0.0  9999.0    46.1    20.0    16.8    11.0
                   5.4   100.0     0.0  9999.0     9.9     2.4     9.1    39.0

        ZIG-ZAG   SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                  16.8    20.0    13.0    14.0  9999.0  9999.0  9999.0  9999.0

  ***** SHIP # 350 *****

      DIMENSION   MATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0   350.0     2.0   101.0   302.0   317.0    50.4     8.6    45.0  9999.0   215.0    34.0    94.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                9999.0    74.0     8.2    13.6     3.0     1.0     1.0    48.0     0.0     1.0  9999.0

        TURNING   SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                   5.1  9999.0    35.0     7.9     3.6  9999.0  9999.0
                   5.2  9999.0   -35.0     8.1     4.0  9999.0  9999.0

       STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                   5.5   100.0     0.0  9999.0     8.8     0.4     8.5    70.0

        ZIG-ZAG   SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                  17.2    20.0     8.0     8.0  9999.0  9999.0  9999.0  9999.0

  ***** SHIP # 351 *****

      DIMENSION   MATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   5.0   351.0     3.0    71.0   217.0   228.0    31.6    13.1     0.0  9999.0    71.0    18.4   122.0
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BEST DOCUMENT AVAILABLE

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RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                14.0    38.0     6.1  9999.0     3.0     3.0     1.0    17.8     0.0     4.0  9999.0

     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                16.3  9999.0    36.0     6.0     3.0     5.4  9999.0
                16.3  9999.0   -34.0     6.5     3.9     6.8  9999.0

    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                16.3   100.0     0.0  9999.0    23.4  9999.0     8.5    45.0

***** SHIP # 352 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 5.0   352.0     5.0   114.0   240.0   252.0    38.0    15.1     0.0  9999.0   114.0    20.7   119.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                15.2    53.0     6.5  9999.0     3.0     3.0     1.0    17.3     0.0     1.0  9999.0

     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                15.8  9999.0    35.0     8.3     4.2     8.7  9999.0
                15.8  9999.0   -35.0     9.2     4.5     9.7  9999.0

    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                15.3   100.0     0.0  9999.0    23.8     1.8    15.3    18.0

***** SHIP # 353 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 5.0   353.0     5.0    34.0   216.0   226.0    31.1     6.3    48.0     0.0  9999.0    17.6   119.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                16.1    33.0     6.2  9999.0     3.0     3.0     1.0    26.4     0.0     1.0  9999.0

     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                17.4  9999.0    35.0     6.7     3.2     6.4  9999.0
                17.4  9999.0   -35.0     6.5     2.8     5.8  9999.0

    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                17.5   100.0     0.0  9999.0    24.4     0.5     9.6    32.0

***** SHIP # 354 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 5.0   354.0     5.0    33.0   248.0   236.0    31.8     5.7   101.0  9999.0  9999.0    15.0   122.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                16.0    40.0     6.0  9999.0     3.0     3.0     1.0    33.2     0.0     4.0  9999.0

     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                16.5  9999.0    35.0     9.7     4.2     8.0  9999.0
                16.5  9999.0   -35.0     9.3     4.2     8.2  9999.0

***** SHIP # 355 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 5.0   355.0     5.0    44.0   236.0   248.0    31.8     7.2    28.0  9999.0  9999.0    15.0   122.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                16.0    40.0     6.0  9999.0     3.0     3.0     1.0    29.6     0.0     4.0  9999.0

     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
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                 7.0 9999.0   35.0    8.1    4.8    9.1 9999.0

***** SHIP # 356 *****

     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  5.0  356.0    5.0  121.0  252.0  262.0   38.0   15.0    0.0    0.0  121.0   27.3  100.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                 16.5   53.0    7.5   10.9    3.0    1.0    1.0   19.6    0.0    1.0 9999.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  5.0 9999.0   40.0   10.9    5.2   11.4 9999.0
                 17.2 9999.0   35.0    9.3    5.0    9.2 9999.0
                 17.2 9999.0  -35.0   10.6    4.8   10.2 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 17.3  120.0    0.0 9999.0   41.4 9999.0   15.1  222.0

       ZIG-ZAG   SPDZ   RUDZ   OVS1   OVSF   OVSW   KPRM   TPRM   PERD
                 16.9   20.0   14.0   14.0 9999.0 9999.0 9999.0 9999.0

***** SHIP # 357 *****

     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  5.0  357.0    5.0   55.0  238.0  249.0   36.6    7.9   28.0    0.0 9999.0   20.7  114.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                 16.9   42.0    6.7 9999.0    2.0    3.0    1.0   25.2    0.0    1.0 9999.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 12.2 9999.0   35.0    7.1    2.1    6.2 9999.0
                 12.2 9999.0  -35.0    7.3    2.9    7.2 9999.0
                 16.7 9999.0   35.0    7.2    2.0    6.2 9999.0
                 16.7 9999.0  -35.0    7.6    2.5    6.9 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 16.7  100.0    0.0 9999.0   26.2    0.1   10.5   24.0

***** SHIP # 358 *****

     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  3.0  358.0    1.0   89.0  237.0 9999.0   36.6   12.6    9.0 9999.0   89.0   22.8  115.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
               9999.0   45.0    6.6 9999.0 9999.0    3.0    1.0   12.7    0.0 9999.0 9999.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 13.9 9999.0   35.0    9.9 9999.0 9999.0 9999.0
                 13.9 9999.0  -35.0    9.2 9999.0 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 14.2  100.0    0.0 9999.0   20.4    5.9    8.0 9999.0

***** SHIP # 359 *****

     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  3.0  359.0    2.0 9999.0  237.0 9999.0   40.8   15.9    0.0 9999.0 9999.0   28.0 9999.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
               9999.0 9999.0 9999.0 9999.0 9999.0    1.0 9999.0   16.6    0.0 9999.0 9999.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
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                 9999.0 9999.0   35.0 9999.0 9999.0   10.5 9999.0
                 9999.0 9999.0  -35.0 9999.0 9999.0    9.9 9999.0

      STOPPING     SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 9999.0  100.0    0.0 9999.0   33.4 9999.0   13.0 9999.0

  ***** SHIP # 360 *****

     DIMENSION     NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                    3.0  360.0    2.0 9999.0  257.0 9999.0   40.8   15.9    0.0 9999.0 9999.0   28.0 9999.0

  RUDDER, PROP     SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 9999.0 9999.0 9999.0 9999.0 9999.0    1.0 9999.0   16.6    0.0 9999.0 9999.0

       TURNING     SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 9999.0 9999.0   35.0 9999.0 9999.0    9.9 9999.0
                 9999.0 9999.0  -35.0 9999.0 9999.0   10.2 9999.0

      STOPPING     SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 9999.0  100.0    0.0 9999.0   34.0 9999.0   14.0 9999.0


  ***** SHIP # 361 *****

     DIMENSION     NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                    3.0  361.0    2.0 9999.0  253.0 9999.0   38.9    7.9 9999.0 9999.0 9999.0   24.0  108.0

  RUDDER, PROP     SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 9999.0 9999.0 9999.0 9999.0 9999.0    1.0 9999.0   28.4    0.0 9999.0 9999.0

       TURNING     SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 9999.0 9999.0   35.0 9999.0 9999.0   10.9 9999.0
                 9999.0 9999.0  -35.0 9999.0 9999.0   12.0 9999.0

      STOPPING     SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 9999.0  100.0    0.0 9999.0   32.5 9999.0   12.0 9999.0


  ***** SHIP # 362 *****

     DIMENSION     NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                    3.0  362.0    2.0 9999.0  253.0 9999.0   38.9   13.4    0.0 9999.0 9999.0   24.0   92.0

  RUDDER, PROP     SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 9999.0 9999.0 9999.0 9999.0 9999.0    1.0 9999.0   14.6    0.0 9999.0 9999.0

       TURNING     SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 9999.0 9999.0   35.0 9999.0 9999.0    9.5 9999.0
                 9999.0 9999.0  -35.0 9999.0 9999.0    9.7 9999.0

      STOPPING     SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                   16.2  100.0    0.0 9999.0   38.4 9999.0   14.0 9999.0


  ***** SHIP # 363 *****

     DIMENSION     NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                    3.0  363.0    2.0 9999.0  253.0 9999.0   38.9    7.6 9999.0 9999.0 9999.0   24.0 9999.0

  RUDDER, PROP     SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 9999.0 9999.0 9999.0   11.5 9999.0    1.0 9999.0   29.1    0.0 9999.0 9999.0

       TURNING     SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 9999.0 9999.0   35.0 9999.0 9999.0    8.6 9999.0
                 9999.0 9999.0  -35.0 9999.0 9999.0    9.4 9999.0
      STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  15.5  100.0    0.0 9999.0   26.0 9999.0   12.0 9999.0

  ***** SHIP # 364 *****

    DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  3.0  364.0    2.0 9999.0  267.0 9999.0   38.9   12.3    0.0 9999.0 9999.0   21.0 9999.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               9999.0 9999.0 9999.0 9999.0 9999.0    3.0 9999.0   21.4    0.0 9999.0 9999.0

      TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               9999.0 9999.0   35.0 9999.0 9999.0    8.6 9999.0
               9999.0 9999.0  -35.0 9999.0 9999.0    8.6 9999.0

     STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               9999.0  100.0    0.0 9999.0   30.8 9999.0   14.0 9999.0

  ***** SHIP # 365 *****

    DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  8.0  365.0    2.0  111.0  250.0 9999.0   38.1   14.3    0.0 9999.0  111.0   24.1  105.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               9999.0   62.0    7.5   12.0 9999.0    1.0    1.0   52.4    0.0 9999.0 9999.0

      TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 16.5 9999.0  -35.0    7.8 9999.0 9999.0 9999.0

     STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 16.5  100.0    0.0 9999.0   33.4 9999.0   12.0 9999.0

  ***** SHIP # 366 *****

    DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  8.0  366.0    1.0   84.0  232.0 9999.0   33.5   13.2    0.0 9999.0   84.0   17.0  110.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               9999.0   43.0    6.4   12.0 9999.0    3.0    1.0   11.8    0.0 9999.0 9999.0

      TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               9999.0 9999.0  -35.0    7.1 9999.0 9999.0 9999.0

     STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 16.3  100.0    0.0 9999.0   26.6 9999.0   11.5 9999.0

  ***** SHIP # 367 *****

    DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  8.0  367.0    2.0  109.0  257.0 9999.0   38.7   15.4    0.0 9999.0  109.0   29.4  108.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               9999.0   52.0    7.2   20.0 9999.0    1.0    1.0   13.5    0.0 9999.0 9999.0

      TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               9999.0 9999.0   35.0    8.2 9999.0 9999.0 9999.0
               9999.0 9999.0  -35.0    8.8 9999.0 9999.0 9999.0

     STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 17.9  100.0    0.0 9999.0   33.0    5.5   12.5 9999.0
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***** SHIP # 368 *****

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   8.0   368.0     2.0   134.0   253.0  9999.0    42.0    15.0     0.0  9999.0   134.0    18.0   119.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                9999.0    61.0     6.7    16.0  9999.0     3.0     1.0    14.3     0.0  9999.0  9999.0

       TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                9999.0  9999.0    35.0     8.7  9999.0  9999.0  9999.0
                9999.0  9999.0   -35.0     8.4  9999.0  9999.0  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  13.6   100.0     0.0  9999.0    25.8  9999.0    11.5  9999.0


***** SHIP # 369 *****

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   8.0   369.0     2.0   237.0   310.0  9999.0    47.2    18.8     0.0  9999.0   237.0    28.0    85.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                9999.0    79.0     8.8    14.0  9999.0     1.0     1.0    20.5     0.0  9999.0  9999.0

       TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                9999.0  9999.0    35.0    11.4  9999.0  9999.0  9999.0
                9999.0  9999.0   -35.0    10.6  9999.0  9999.0  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  15.5   100.0     0.0  9999.0    35.9  9999.0    15.6  9999.0


***** SHIP # 370 *****

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   8.0   370.0     3.0    79.0   243.0  9999.0    31.7    12.2     0.0  9999.0    79.0    20.7   114.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                9999.0    44.0  9999.0  9779.0  9999.0     3.0     1.0    18.6     0.0  9999.0  9999.0

       TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  16.0  9999.0    35.0     6.6  9999.0  9999.0  9999.0
                  16.0  9999.0    35.0     6.8  9999.0  9999.0  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  15.9   100.0     0.0  9999.0    23.8  9999.0     8.8  9999.0


***** SHIP # 371 *****

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   8.0   371.0     3.0  9779.0   243.0  9999.0    31.7  9999.0  9999.0  9999.0    79.0    20.7   114.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                9999.0    44.0  9999.0  9999.0  9999.0     3.0     1.0  9999.0     0.0  9999.0  9999.0

       TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  16.0  9999.0    35.0     6.2  9999.0  9999.0  9999.0
                  16.0  9999.0   -35.0     6.3  9999.0  9999.0  9999.0


***** SHIP # 372 *****

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   8.0   372.0     1.0    64.0   206.0  9999.0    31.7    13.0     0.0  9999.0    64.0    18.0   111.0
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    RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  9999.0    35.0     6.7     9.8  9999.0     1.0     1.0     7.2     0.0  9999.0  9999.0

         TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                  9999.0  9999.0    35.0     4.6  9999.0  9999.0  9999.0
                  9999.0  9999.0   -35.0     5.8  9999.0  9999.0  9999.0

        STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                    18.0   100.0     0.0  9999.0    18.0    11.0    11.0  9999.0

   ***** SHIP # 373 *****

       DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                     8.0   373.0     1.0    98.0   233.0  9999.0    37.2    12.9     2.0  9999.0    98.0    24.3   108.0

    RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  9999.0    45.0     7.0    12.0  9999.0     1.0     1.0    13.0     0.0  9999.0  9999.0

         TURNING    SPDT    SPDF    RUDT    ADVT    TRNT  . DIAT    FRPM
                  9999.0  9999.0    35.0     6.9  9999.0  9999.0  9999.0
                  9999.0  9999.0   -35.0     7.4  9999.0  9999.0  9999.0

        STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                    16.5   100.0     0.0  9999.0    26.7    10.4    12.3  9999.0

   ***** SHIP # 374 *****

       DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                     8.0   374.0     2.0   220.0   305.0  9999.0    47.2    18.4     0.0  9999.0   220.0    29.0    85.0

    RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  9999.0   110.0     8.9  9999.0  9999.0     1.0     1.0    19.1     0.0  9999.0  9999.0

         TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                    16.0  9999.0    35.0    10.7  9999.0  9999.0  9999.0
                    16.0  9999.0   -35.0    10.3  9999.0  9999.0  9999.0

        STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                    16.0   100.0     0.0  9999.0    43.8  9999.0    17.6  9999.0

   ***** SHIP # 375 *****

       DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                     8.0   375.0     1.0    69.0   226.0  9999.0    32.2    11.6     0.0  9999.0    69.0    17.0   104.0

    RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  9999.0  9999.0     6.6    17.0  9999.0     3.0     1.0    13.6     0.0  9999.0  9999.0

         TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                    16.0  9999.0    35.0     8.5  9999.0  9999.0  9999.0
                    16.0  9999.0   -35.0     9.4  9999.0  9999.0  9999.0

        STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                    16.0   100.0     0.0  9999.0    23.0  9999.0     8.3  9999.0

   ***** SHIP # 426 *****

       DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                     8.0   426.0     2.0   101.0   250.0  9999.0    34.3    14.3     0.0  9999.0   101.0    26.1   108.0

    RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
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             9999.0   62.0    7.5   12.0 9999.0    1.0    1.0   14.3    0.0 9999.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               16.0 9999.0   35.0    8.3 9999.0 9999.0 9999.0
               16.4 9999.0  -35.0    9.2 9999.0 9999.0 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TINS   TINR
               16.4  100.0    0.0 9999.0   31.3   10.4   11.5 9999.0

***** SHIP # 427 *****

   DIMENSION   HATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                8.0  427.0    1.0   62.0  215.0 9999.0   31.1   11.4    0.0 9999.0   62.0   19.0  103.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHUV   TRLC
             9999.0   44.0    7.0    8.0 9999.0    1.0    1.0   10.6    0.0 9999.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               16.2 9999.0   35.0    9.0 9999.0 9999.0 9997.0
               16.2 9999.0  -35.0    9.0 9999.0 9999.0 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TINS   TINR
             9999.0  100.0    0.0 9999.0   34.4   11.2    8.0 9999.0

***** SHIP # 428 *****

   DIMENSION   HATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                8.0  428.0    2.0  134.0  274.0 9999.0   39.0   15.4    2.0 9999.0  134.0   25.0  105.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHUV   TRLC
             9999.0   58.0    7.4   13.8 9999.0    1.0    1.0 9999.0 9999.0 9999.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
             9999.0 9999.0   35.0    8.4 9999.0    8.0 9999.0
             9999.0 9999.0  -35.0    7.6 9999.0    7.2 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TINS   TINR
             9999.0  100.0    0.0 9999.0   34.4    9.6   19.0 9999.0

***** SHIP # 429 *****

   DIMENSION   HATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                8.0  429.0    2.0   59.0  274.0 9999.0   39.0    7.4   22.0 9999.0  134.0   25.0  105.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHUV   TRLC
             9999.0   39.0    7.4   13.8 9999.0    1.0    1.0 9999.0 9999.0 9999.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
             9999.0 9999.0   35.0    8.8 9999.0    7.2 9999.0
             9999.0 9999.0  -35.0    7.2 9999.0    7.2 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TINS   TINR
             9999.0  100.0    0.0 9999.0   30.8    4.0   15.5 9999.0

***** SHIP # 430 *****

   DIMENSION   HATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                8.0  430.0    1.0   66.0  221.0 9999.0   30.6   12.4    0.0 9999.0   66.0   16.0  105.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHUV   TRLC
             9999.0   38.0    6.4    9.6 9999.0    1.0    1.0 9999.0 9999.0 9999.0 9999.0
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     TURNING     SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
               9999.0  9999.0    35.0     6.5  9999.0     6.0  9999.0
               9999.0  9999.0   -35.0     5.2  9999.0     6.0  9999.0

     STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 15.5   100.0     0.0  9999.0    19.8     3.2    10.5  9999.0

 $$$$$ SHIP # 431 $$$$$

     DIMENSION   MATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    BDIS    SBHP    SRPM
                  8.0   431.0     1.0    69.0   225.0  9999.0    32.2    11.6     0.0  9999.0    69.0    10.2   122.0

     RUDDER, PROP SSPD   RDAR    PDIA    ASHP    RBST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
               9999.0    41.0     6.4     7.2  9999.0     3.0     1.0  9999.0  9999.0  9999.0  9999.0

     TURNING     SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 15.4  9999.0   -35.0     6.6  9999.0     6.1  9999.0
                 15.4  9999.0   -35.0     6.8  9999.0     5.9  9999.0

     STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 15.8   100.0     0.0  9999,0    28.6    13.7    11.3  9999.0

 $$$$$ SHIP # 432 $$$$$

     DIMENSION   MATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    BDIS    SBHP    SRPM
                  3.0   432.0     1.0    87.0   229.0  9999.0    36.0    12.8     0.0  9999.0    87.0    19.0   124.0

     RUDDER, PROP SSPD   RDAR    PDIA    ASHP    RBST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
               9999.0    47.0     6.2  9999.0  9999.0     3.0     1.0  9999.0  9999.0  9999.0  9999.0

     TURNING     SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 15.5  9999.0    35.0     6.7  9999.0     5.2  9999.0
                 15.5  9999.0   -35.0     6.6  9999.0     5.5  9999.0

     STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 15.8   100.0     0.0  9999.0    21.9    10.4     8.3  9999.0

 $$$$$ SHIP # 433 $$$$$

     DIMENSION   MATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    BDIS    SBHP    SRPM
                  8.0   433.0     1.0    89.0   238.0  9999.0    35.4    13.1     0.0  9999.0    89.0    22.0   105.0

     RUDDER, PROP SSPD   RDAR    PDIA    ASHP    RBST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
               9999.0    45.0     7.3     8.0  9999.0     1.0     1.0    11.8     0.0  9999.0  9999.0

     TURNING     SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
               9999.0  9999.0    35.0     7.9  9999.0  9999.0  9999.0
               9999.0  9999.0   -35.0     8.8  9999.0  9999.0  9999.0

     STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 16.8   100.0     0.0  9999.0    29.9  9999.0    11.5  9999.0

 $$$$$ SHIP # 434 $$$$$

     DIMENSION   MATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    BDIS    SBHP    SRPM
                  8.0   434.0     1.0    76.0   221.0  9999.0    33.2    12.2     0.0  9999.0    76.0    22.0   105.0

     RUDDER, PROP SSPD   RDAR    PDIA    ASHP    RBST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
               9999.0    37.0     7.0  9999.0  9999.0     1.0     1.0    12.0     6.0  9999.0  9999.0

     TURNING     SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 17.2  9999.0    35.0     7.1  9999.0  9999.0  9999.0
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                 17.2 9999.0  -35.0    7.4 9999.0 9999.0 9999.0

    STOPPING     SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 16.9  100.0    0.0 9999.0   16.1    9.8    9.2 9999.0

  ##### SHIP # 435 #####
    DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  8.0  435.0    2.0  112.0  265.0 9999.0   38.9   12.8    2.0 9999.0  112.0   22.0   82.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
               9999.0   49.0    8.0    6.9 9999.0    1.0    1.0   18.6    0.0 9999.0 9999.0

     TURNING     SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 16.5 9999.0   35.0    9.0 9999.0 9999.0 9999.0
                 16.5 9999.0  -35.0    8.5 9999.0 9999.0 9999.0

    STOPPING     SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               9999.6  100.0    0.0 9999.0   26.5    9.2   13.0 9999.0

  ##### SHIP # 436 #####
    DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  8.0  436.0    1.0   93.0  250.0 9999.0   35.0   13.5    0.0 9999.0   93.0   22.7  115.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
               9999.0   46.0    7.1    8.1 9999.0    1.0    1.0   14.5    0.0 9999.0 9999.0

    STOPPING     SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 17.4  100.0    0.0 9999.0   35.8 9999.0   13.2 9999.0

  ##### SHIP # 437 #####
    DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  8.0  437.0    3.0   66.0  220.0 9999.0   31.1   11.6    0.0 9999.0   66.0   22.0  105.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
               9999.0   35.0    7.0 9999.0 9999.0    1.0    1.0   14.5    0.0 9999.0 9999.0

     TURNING     SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 17.1 9999.0   35.0    7.1 9999.0 9999.0 9999.0
                 17.1 9999.0  -35.0    7.1 9999.0 9999.0 9999.0

    STOPPING     SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 17.1  100.0    0.0 9999.0   24.6 9999.0    8.3 9999.0

  ##### SHIP # 438 #####
    DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  8.0  438.0    3.0   49.0  229.0 9999.0   32.3    7.8    8.0 9999.0 9999.0   16.5  103.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
               9999.0   46.0    6.7    7.5 9999.0    1.0    1.0   32.1    0.0 9999.0 9999.0

     TURNING     SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 16.2 9999.0   35.0    5.6 9999.0 9999.0 9999.0
                 16.2 9999.0  -35.0    4.2 9999.0 9999.0 9999.0

    STOPPING     SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 16.2  100.0    0.0 9999.0   16.0 9999.0    7.6 9999.0
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##### SHIP # 439 #####

    DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   BDIS   SSHP   SRPM
                 8.0  439.0    1.0   88.0  274.0 9999.0   41.2    7.6   20.0 9999.0 9999.0   25.0  100.0

 RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
              9999.0   57.0    7.5   12.5 9999.0    1.0    1.0   38.5    0.0 9999.0 9999.0

     STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                17.2  100.0    0.0 9999.0   24.4 9999.0    9.3 9999.0

##### SHIP # 440 #####

    DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   BDIS   SSHP   SRPM
                 1.0  440.0    3.0   53.0  229.0 9999.0   32.3    8.5    1.0 9999.0 9999.0   16.5  103.0

 RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
              9999.0   47.0    6.7    7.8 9999.0    1.0    1.0   20.5    0.0 9999.0 9999.0

      TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                16.0 9999.0   35.0    5.4 9999.0 9999.0 9999.0
                16.0 9999.0  -35.0    4.2 9999.0 9999.0 9999.0

     STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                15.3  100.0    0.0 9999.0   16.0 9999.0    7.6 9999.0

##### SHIP # 441 #####

    DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   BDIS   SSHP   SRPM
                 1.0  441.0    1.0   60.0  248.0 9999.0   38.1   18.7   41.0 9999.0 9999.0   21.2  124.0

 RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
              9999.0   54.0    6.7   11.5 9999.0    1.0    1.0   29.0    0.0 9999.0 9999.0

     STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                15.4  100.0    0.0 9999.0   21.0 9999.0    7.8 9999.0

##### SHIP # 442 #####

    DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   BDIS   SSHP   SRPM
                 1.0  442.0    4.0   87.0  286.0 9999.0   43.3   24.7   18.0 9999.0 9999.0   27.5  103.0

 RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
              9999.0   58.0    7.6   12.5 9999.0    1.0    1.0   49.4    0.0 9999.0 9999.0

      TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                18.3 9999.0   35.0    9.7 9999.0 9999.0 9999.0
                18.3 9999.0  -35.0    8.7 9999.0 9999.0 9999.0

     STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                18.2  100.0    0.0 9999.0   31.6 9999.0   11.1 9999.0

##### SHIP # 443 #####

    DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   BDIS   SSHP   SRPM
                 1.0  443.0    1.0   69.0  218.0 9999.0   31.7   16.2    0.0 9999.0   69.0   19.0  105.0

 RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
              9999.0   37.0    6.9   11.5 9999.0    1.0    1.0   11.9    0.0 9999.0 9999.0

      TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
              9999.0 9999.0   35.0    6.6 9999.0 9999.0 9999.0
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          9999.0 9999.0  -35.0    7.2 9999.0 9999.0 9999.0

    STOPPING     SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 16.9  100.0    0.0 9999.0   22.5 9999.0    8.8 9999.0

***** SHIP # 444 *****

   DIMENSION     NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  1.0  444.0    3.0   57.0  216.0 9999.0   36.6   15.4    0.0 9999.0   57.0   20.2  110.0

RUDDER, PROP     SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
               9999.0   32.0    6.7    9.7 9999.0    1.0    1.0   11.2    0.0 9999.0 9999.0

     TURNING     SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 17.2 9999.0   35.0    8.1 9999.0 9999.0 9999.0
                 17.2 9999.0  -35.0    8.3 9999.0 9999.0 9999.0

    STOPPING     SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 17.2  100.0    0.0 9999.0   33.3 9999.0   12.0 9999.0

***** SHIP # 445 *****

   DIMENSION     NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  1.0  445.0    1.0   60.0  213.0 9999.0   30.5   15.2    0.0 9999.0   60.0   18.6  114.0

RUDDER, PROP     SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
               9999.0   32.0    6.6    8.1 9999.0    1.0    1.0   10.4    0.0 9999.0 9999.0

     TURNING     SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               9999.0 9999.0   35.0    6.6 9999.0 9999.0 9999.0
               9999.0 9999.0  -35.0    6.1 9999.0 9999.0 9999.0

    STOPPING     SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 16.3  100.0    0.0 9999.0   18.3   11.4    9.7 9999.0

***** SHIP # 446 *****

   DIMENSION     NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  1.0  446.0    1.0   59.0  213.0 9999.0   30.5   15.2    0.0 9999.0   59.0   18.0  116.0

RUDDER, PROP     SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
               9999.0   32.0    6.6    8.0 9999.0    1.0    1.0   10.4    0.0 9999.0 9999.0

     TURNING     SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               9999.0 9999.0   35.0    6.6 9999.0 9999.0 9999.0
               9999.0 9999.0  -35.0    6.7 9999.0 9999.0 9999.0

    STOPPING     SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 17.5  100.0    0.0 9999.0   24.2    9.4    8.5 9999.0

***** SHIP # 447 *****

   DIMENSION     NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  1.0  447.0    1.0   61.0  216.0 9999.0   31.1   11.4    5.0 9999.0   61.0   20.7  105.0

RUDDER, PROP     SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
               9999.0   38.0    6.7 9999.0 9999.0    1.0    1.0   11.0    0.0 9999.0 9999.0

    STOPPING     SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 16.0  100.0    0.0 9999.0   18.4 9999.0    7.5 9999.0
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***** SHIP # 448 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 1.0   448.0     1.0  9999.0   216.0  9999.0    31.1     6.4    45.0  9999.0    61.0    20.7   105.0
RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
              9999.0    30.0     6.7  9999.0  9999.0     1.0     1.0    22.0     0.0  9999.0  9999.0
     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
              9999.0  9999.0    35.0     5.8  9999.0  9999.0  9999.0
              9999.0  9999.0   -35.0     4.9  9999.0  9999.0  9999.0

***** SHIP # 449 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 1.0   449.0     3.0    45.0   230.0  9999.0    35.4     7.0    28.0  9999.0  9999.0    16.5   104.0
RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
              9999.0    56.0     5.5     4.7  9999.0     1.0     4.0    25.6     0.0  9999.0  9999.0
     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
              9999.0  9999.0    35.0     9.1  9999.0  9999.0  9999.0
              9999.0  9999.0   -35.0     7.2  9999.0  9999.0  9999.0
    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                15.7   100.0     0.0  9999.0  9999.0  9999.0     8.1  9999.0

***** SHIP # 450 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 1.0   450.0     1.0    43.0   223.0  9999.0    32.2     7.3    34.0  9999.0  9999.0    18.9   119.0
RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
              9999.0    39.0     6.7    14.4  9999.0     1.0     1.0    22.0     0.0  9999.0  9999.0
     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                16.8  9999.0    35.0     6.2  9999.0  9999.0  9999.0
                17.2  9999.0   -35.0     7.0  9999.0  9999.0  9999.0
    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                17.2   100.0     0.0  9999.0    27.7  9999.0     6.5  9999.0

***** SHIP # 451 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 1.0   451.0     3.0    45.0   212.0  9999.0    32.5     7.6    41.0  9999.0  9999.0    13.8   103.0
RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
              9999.0    43.0     6.4     6.2  9999.0     1.0     1.0    23.2     0.0  9999.0  9999.0
     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                15.4  9999.0    35.0     6.1  9999.0  9999.0  9999.0
                15.4  9999.0   -35.0     5.3  9999.0  9999.0  9999.0
    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                15.4   100.0     0.0  9999.0    17.2  9999.0     7.2  9999.0

***** SHIP # 452 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 1.0   452.0     3.0    42.0   216.0  9999.0    31.1     7.5    26.0  9999.0  9999.0    13.8   103.0
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RUDDER, PROP      SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                9999.0    43.0     6.4     6.1  9999.0     1.0     1.0    19.9     0.0  9999.0  9999.0

       TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                9999.0  9999.0    35.0     5.5  9999.0  9999.0  9999.0
                9999.0  9999.0   -35.0     5.6  9999.0  9999.0  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  16.2   100.0     0.0  9999.0    21.4  9999.0     8.8  9999.0


***** SHIP # 453 *****

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   1.0   453.0     2.0   139.0   272.0  9999.0    40.2    15.2     0.0  9999.0   139.0    42.4   115.0

RUDDER, PROP      SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                9999.0    95.0     6.7    15.0  9999.0     1.0     4.0    17.8     0.0  9999.0  9999.0

       TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                9999.0  9999.0    35.0     7.3  9999.0  9999.0  9999.0
                9999.0  9999.0   -35.0     7.4  9999.0  9999.0  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  19.0   100.0     0.0  9999.0    22.6  9999.0     8.7  9999.0
                  10.9   100.0     0.0  9999.0    13.7  9999.0     8.0  9999.0


***** SHIP # 454 *****

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   1.0   454.0     1.0    88.0   250.0  9999.0    31.7    13.4     0.0  9999.0    88.0    22.7   115.0

RUDDER, PROP      SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                9999.0    46.0     7.0     8.1  9999.0     1.0     1.0    14.8     0.0  9999.0  9999.0

       TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                9999.0  9999.0    35.0     7.3  9999.0  9999.0  9999.0
                9999.0  9999.0   -35.0     7.3  9999.0  9999.0  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  16.8   100.0     0.0  9999.0    24.2  9999.0     9.7  9999.0
                   8.9   100.0     0.0  9999.0    14.3  9999.0     9.5  9999.0


***** SHIP # 455 *****

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   1.0   455.0     1.0    63.0   217.0  9999.0    31.0    11.5     0.0  9999.0    63.0    18.0   110.0

RUDDER, PROP      SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                9999.0    34.0     6.6     8.5  9999.0     1.0     1.0    10.9     0.0  9999.0  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  17.2   100.0     0.0  9999.0    27.5  9999.0    12.4  9999.0


***** SHIP # 456 *****

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   1.0   456.0     1.0    43.0   217.0  9999.0    31.0     7.9    16.0  9999.0    43.0    18.0   110.0

RUDDER, PROP      SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                9999.0    34.0     6.6     8.5  9999.0     1.0     1.0    10.6     0.0  9999.0  9999.0

       TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
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                    9999.0 9999.0   35.0     5.3 9999.0 9999.0 9999.0
                    9999.0 9999.0  -35.0     6.3 9999.0 9999.0 9999.0

      STOPPING       SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                     17.0  100.0    0.0 9999.0   23.8 9999.0   10.3 9999.0

   ***** SHIP # 457 *****

      DIMENSION      NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   BDIS   SSHP   SRPM
                      1.0  457.0    1.0   80.0  233.0 9999.0   35.4   12.2    0.0 9999.0   80.0   19.4  106.0

   RUDDER, PROP      SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WKWV   TRLC
                   9999.0   55.0    7.0    6.4 9999.0    1.0    1.0   12.6    0.0 9999.0 9999.0

        TURNING      SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                   9999.0 9999.0   35.0    7.5 9999.0 9999.0 9999.0
                   9999.0 9999.0  -35.0    7.4 9999.0 9999.0 9999.0

       STOPPING      SPDS   SHPS   RUDS   TDIS   HRCH , SRCH   TIMS   TIMR
                     17.0  100.0    0.0 9999.0   26.2   12.8    9.7 9999.0

   ***** SHIP # 458 *****

      DIMENSION      NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   BDIS   SSHP   SRPM
                      1.0  458.0    1.0   45.0  233.0 9999.0   35.4    6.4   42.0 9999.0   80.0   19.4  106.0

   RUDDER, PROP      SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WKWV   TRLC
                   9999.0   46.5    7.0    6.4 9999.0    1.0    1.0   26.1    0.0 9999.0 9999.0

        TURNING      SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                   9999.0 9999.0   35.0    7.4 9999.0 9999.0 9999.0
                   9999.0 9999.0  -35.0    7.6 9999.0 9999.0 9999.0

       STOPPING      SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                     17.0  100.0    0.0 9999.0   23.4   30.5   11.7 9999.0

   ***** SHIP # 459 *****

      DIMENSION      NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   BDIS   SSHP   SRPM
                      5.0  459.0    2.0  271.0  304.0 9999.0   52.4   19.9    0.0 9999.0  271.0   34.0   91.0

   RUDDER, PROP      SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WKWV   TRLC
                   9999.0   97.0    8.5 9999.0 9999.0    1.0    1.0   20.7    0.0 9999.0 9999.0

        TURNING      SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                      8.3 9999.0   35.0    9.4 9999.0    7.6 9999.0
                      8.1 9999.0  -35.0    9.6 9999.0    8.1 9999.0

   ***** SHIP # 460 *****

      DIMENSION      NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   BDIS   SSHP   SRPM
                      5.0  460.0    2.0  312.0  318.0 9999.0   56.0   20.6    0.0 9999.0  312.0   36.0   85.0

   RUDDER, PROP      SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WKWV   TRLC
                   9999.0  112.0    8.9 9999.0 9999.0    1.0    1.0   21.7    0.0 9999.0 9999.0

        TURNING      SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                     16.0 9999.0   35.0    9.8 9999.0    6.0 9999.0
                     16.0 9999.0  -35.0    9.7 9999.0    6.4 9999.0
                      6.5 9999.0   35.0    7.6 9999.0    6.2 9999.0
                      6.8 9999.0  -35.0    8.3 9999.0    8.0 9999.0
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***** SHIP # 461 *****
    DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  5.0  461.0    2.0  139.0  318.0 9999.0   54.0    9.4   41.0 9999.0  312.0   36.0   85.0
  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
               9999.0   89.0    8.9 9999.0 9999.0    1.0    1.0   56.5    0.0 9999.0 9999.0
      TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 17.7 9999.0   35.0    8.6 9999.0    4.3 9999.0
                 17.7 9999.0  -35.0    8.5 9999.0    4.4 9999.0

***** SHIP # 462 *****
    DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  5.0  462.0    2.0  269.0  310.0 9999.0   54.0   19.4    0.0 9999.0  269.0   36.0   85.0
  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
               9999.0   90.0    8.8 9999.0 9999.0    1.0    1.0   24.7    0.0 9999.0 9999.0
      TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 16.9 9999.0   35.0    9.1 9999.0    6.6 9999.0
                 16.4 9999.0  -35.0    9.9 9999.0    7.0 9999.0
                  6.1 9999.0   35.0    8.8 9999.0    8.5 9999.0
                  6.5 9999.0  -35.0    9.5 9999.0    8.2 9999.0
     STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 17.4  100.0    0.0 9999.0   44.6   19.5   17.2 9999.0

***** SHIP # 463 *****
    DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  5.0  463.0    2.0  129.0  310.0 9999.0   54.0   10.0   37.0 9999.0  269.0   36.0   85.0
  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
               9999.0   88.0    8.8 9999.0 9999.0    1.0    1.0   54.0    0.0 9999.0 9999.0
      TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 17.9 9999.0   35.0    8.9 9999.0    7.0 9999.0
                 17.9 9999.0  -35.0    8.6 9999.0    7.8 9999.0
                  7.2 9999.0   35.0    7.9 9999.0    7.6 9999.0
                  7.1 9999.0  -35.0    7.6 9999.0    9.8 9999.0
     STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 16.9  100.0    0.0 9999.0   34.7    6.6   14.0 9999.0

***** SHIP # 464 *****
    DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  5.0  464.0    1.0   39.0  142.0 9999.0   26.0   10.0    0.0 9999.0   39.0   11.2  119.0
  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
               9999.0   28.0    5.8 9999.0 9999.0    2.0    1.0    7.7    0.0 9999.0 9999.0
      TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 15.0 9999.0   35.0    5.0 9999.0    4.4 9999.0
                 14.8 9999.0  -35.0    5.0 9999.0    3.4 9999.0
                  8.3 9999.0   35.0    4.8 9999.0    3.5 9999.0
                  8.1 9999.0  -35.0    4.3 9999.0    3.4 9999.0
      ZIG-ZAG    SPDZ   RUDZ   OVSI   OVSF   OVSW   RPRM   TPRM   PERD
                 11.2   10.0   11.0 9999.0 9999.0    2.6    3.8 9999.0
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***** SHIP # 465 *****

    DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  5.0   465.0     1.0    20.0   162.0  9999.0    26.0     5.8    43.0  9999.0    20.0    11.2   119.0
 RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
               9999.0    23.0     5.8  9999.0  9999.0     3.0     1.0    15.8     0.0  9999.0  9999.0
      TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 16.2  9999.0    35.0     5.0  9999.0     3.7  9999.0
                 16.2  9999.0   -35.0     5.4  9999.0     3.2  9999.0
                  7.9  9999.0    35.0     4.2  9999.0     4.0  9999.0
                  7.8  9999.0   -35.0     4.4  9999.0     3.6  9999.0
      ZIG-ZAG    SPDZ    RUDZ    OVS1    OVSF    OVSW    KPRM    TPRM    PERD
                 10.8    10.0     5.0  9999.0  9999.0     1.6     1.4  9999.0

***** SHIP # 466 *****

    DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  5.0   466.0     2.0   478.0   360.0  9999.0    69.0    22.0     0.0  9999.0   478.0    45.0    80.0
 RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
               9999.0   162.0     9.8  9999.0  9999.0     1.0     1.0    24.9     0.0  9999.0  9999.0
      TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 16.0  9999.0    35.0    10.8  9999.0     5.6  9999.0
                 16.1  9999.0   -35.0    11.1  9999.0     6.2  9999.0

***** SHIP # 467 *****

    DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  5.0   467.0     2.0   216.0   360.0  9999.0    69.0    11.0    35.0  9999.0   478.0    45.0    80.0
 RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
               9999.0   162.0     9.8  9999.0  9999.0     1.0     1.0    67.4     0.0  9999.0  9999.0
      TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 17.5  9999.0    35.0     9.3  9999.0     7.0  9999.0
                 17.8  9999.0   -35.0     9.7  9999.0     7.4  9999.0

***** SHIP # 468 *****

    DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  5.0   468.0     2.0   267.0   306.0  9999.0    53.0    19.5     0.0  9999.0   267.0    36.0    90.0
 RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
               9999.0    99.0     8.6  9999.0  9999.0     1.0     1.0    20.8     0.0  9999.0  9999.0
      TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 16.5  9999.0    35.0     8.6  9999.0     6.8  9999.0
                 16.5  9999.0   -35.0     9.6  9999.0     6.8  9999.0

***** SHIP # 469 *****

    DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  5.0   469.0     2.0   120.0   306.0  9999.0    53.0     9.4    35.0  9999.0   267.0    36.0    90.0
 RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
               9999.0    99.0     8.6  9999.0  9999.0     1.0     1.0    51.5     0.0  9999.0  9999.0
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         TURNING     SPDT   SPDF    RUDT    ADVT   TRNT    DIAT   FRPM
                     17.2 9999.0    35.0     9.6 9999.0     6.2 9999.0
                     17.2 9999.0   -35.0     8.6 9999.0     5.4 9999.0

***** SHIP # 470 *****

       DIMENSION     NATN   NMBR    TYPE    DISP   LBPX    LOAX   BEAM    DRFT    TRIM   BULB    DDIS   SSHP   SRPM
                      5.0  470.0     2.0   268.0  306.0  9999.0   53.0    19.6     0.0 9999.0  268.0   36.0   90.0

   RUDDER, PROP      SSPD   RDAR    PDIA    ASHP   RDST    ENGN   PROP    LATA    LCAX   WHWV    TRLC
                   9999.0   99.0     8.6 9999.0 9999.0      1.0    1.0    20.4     0.0 9999.0 9999.0

         TURNING     SPDT   SPDF    RUDT    ADVT   TRNT    DIAT   FRPM
                     17.0 9999.0    35.0     9.0 9999.0     6.5 9999.0
                     17.0 9999.0   -35.0     9.2 9999.0     7.0 9999.0

         ZIG-ZAG     SPDZ   RUDZ    OVS1    OVSF   OVSW    KPRM   TPRM    PERD
                     16.6   15.0    25.0 9999.0 9999.0      2.6    7.7 9999.0
                     16.3   15.0    25.0 9999.0 9999.0      3.1    8.6 9999.0

***** SHIP # 471 *****

       DIMENSION     NATN   NMBR    TYPE    DISP   LBPX    LOAX   BEAM    DRFT    TRIM   BULB    DDIS   SSHP   SRPM
                      5.0  471.0     2.0   118.0  306.0  9999.0   53.0     9.4    35.0 9999.0  268.0   36.0   90.0

   RUDDER, PROP      SSPD   RDAR    PDIA    ASHP   RDST    ENGN   PROP    LATA    LCAX   WHWV    TRLC
                   9999.0   99.0     8.6 9999.0 9999.0      1.0    1.0    51.5     0.0 9999.0 9999.0

         TURNING     SPDT   SPDF    RUDT    ADVT   TRNT    DIAT   FRPM
                     18.6 9999.0    35.0     8.6 9999.0     6.4 9999.0
                     18.3 9999.0   -35.0     8.6 9999.0     6.2 9999.0

***** SHIP # 472 *****

       DIMENSION     NATN   NMBR    TYPE    DISP   LBPX    LOAX   BEAM    DRFT    TRIM   BULB    DDIS   SSHP   SRPM
                      5.0  472.0     5.0    52.0  248.0  9999.0   32.2    11.0     0.0 9999.0   52.0   80.0  110.0

   RUDDER, PROP      SSPD   RDAR    PDIA    ASHP   RDST    ENGN   PROP    LATA    LCAX   WHWV    TRLC
                   9999.0   58.0     7.0 9999.0 9999.0      3.0    3.0    24.6     0.0 9999.0 9999.0

         ZIG-ZAG     SPDZ   RUDZ    OVS1    OVSF   OVSW    KPRM   TPRM    PERD
                   9999.0    5.0     8.0 9999.0 9999.0      2.0    4.5 9999.0
                   9999.0   10.0     6.0 9999.0 9999.0      1.3    2.2 9999.0
                   9999.0   15.0     6.0 9999.0 9999.0      1.0    1.8 9999.0
                   9999.0   15.0     5.0 9999.0 9999.0      1.0    1.8 9999.0

***** SHIP # 473 *****

       DIMENSION     NATN   NMBR    TYPE    DISP   LBPX    LOAX   BEAM    DRFT    TRIM   BULB    DDIS   SSHP   SRPM
                      5.0  473.0     5.0    32.0  248.0  9999.0   32.2     7.5    30.0 9999.0   52.0   80.0  110.0

   RUDDER, PROP      SSPD   RDAR    PDIA    ASHP   RDST    ENGN   PROP    LATA    LCAX   WHWV    TRLC
                   9999.0   58.0     7.0 9999.0 9999.0      3.0    3.0    33.3     0.0 9999.0 9999.0

         ZIG-ZAG     SPDZ   RUDZ    OVS1    OVSF   OVSW    KPRM   TPRM    PERD
                     30.0    5.0     2.0 9999.0 9999.0      1.0    1.2 9999.0
                     28.9    5.0     2.0 9999.0 9999.0      1.4    1.5 9999.0
                     30.0   10.0     3.0 9999.0 9999.0      0.8    1.2 9999.0
                     30.0   10.0     2.0 9999.0 9999.0      0.9    0.9 9999.0
                     29.8   15.0     2.0 9999.0 9999.0      0.7    0.8 9999.0
                     29.6   15.0     3.0 9999.0 9999.0      0.7    0.8 9999.0
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$$$$$ SHIP # 474 $$$$$

    DIMENSION    NATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  5.0   474.0     3.0    28.0   190.0  9999.0    30.8     5.9    33.0  9999.0  9999.0    15.2   145.0

  RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
               9999.0    30.0     5.3  9999.0  9999.0     3.0     1.0    20.4     0.0  9999.0  9999.0

      TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 15.5  9999.0    35.0     5.5  9999.0     3.3  9999.0
                 15.7  9999.0   -35.0     5.8  9999.0     2.8  9999.0
                  7.5  9999.0    35.0     4.6  9999.0  9999.0  9999.0
                  7.8  9999.0   -35.0     4.5  9999.0  9999.0  9999.0
                 14.8  9999.0    35.0     6.6  9999.0  9999.0  9999.0
                 15.0  9999.0   -35.0     6.4  9999.0  9999.0  9999.0

     STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 17.0   100.0     0.0  9999.0    14.4     0.6     5.6  9999.0
                 16.5   100.0     0.0  9999.0    19.4     3.3     8.5  9999.0
                 16.7   100.0     0.0  9999.0    20.7     2.6    10.0  9999.0

$$$$$ SHIP # 475 $$$$$

    DIMENSION    NATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  5.0   475.0     5.0     8.0   129.0  9999.0    22.4     4.3    41.0  9999.0  9999.0     8.8   155.0

  RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
               9999.0    14.0     4.9     3.7  9999.0     3.0     1.0     9.4     0.0  9999.0  9999.0

      TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 18.5  9999.0    35.0     4.3  9999.0     2.9  9999.0
                 18.0  9999.0   -35.0     4.3  9999.0     3.3  9999.0

     STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 17.2   100.0     0.0  9999.0    10.4     0.6     3.6  9999.0

$$$$$ SHIP # 476 $$$$$

    DIMENSION    NATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  5.0   476.0     3.0    22.0   178.0  9999.0    28.4     5.6    57.0  9999.0  9999.0     9.9   150.0

  RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
               9999.0    30.0     5.2     4.2  9999.0     3.0     1.0    19.1     0.0  9999.0  9999.0

      TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 15.8  9999.0    35.0     5.4  9999.0     3.9  9999.0
                 15.8  9999.0   -35.0     5.3  9999.0     4.0  9999.0

     STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 15.8   100.0     0.0  9999.0    13.2     0.2     5.5  9999.0

$$$$$ SHIP # 477 $$$$$

    DIMENSION    NATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  5.0   477.0     2.0   283.0   320.0  9999.0    54.5    19.2     0.0  9999.0   283.0    40.0    83.0

  RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
               9999.0   110.0     9.4    16.9  9999.0     1.0     1.0    24.8     0.0  9999.0  9999.0

      TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                 17.1  9999.0    35.0     9.5  9999.0     7.3  9999.0
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                  17.1 9999.0  -35.0    9.8 9999.0    7.8 9999.0

       STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  17.9  100.0    0.0 9999.0   44.0   20.8   18.0 9999.0

 ***** SHIP # 478 *****

      DIMENSION   NATH   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   5.0  478.0    2.0  131.0  320.0 9999.0   54.5    9.6   74.0 9999.0  283.0   40.0   83.0

 RUDDER, PROP     SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                9999.0  108.0    9.4   16.9 9999.0    1.0    1.0   55.8    0.0 9999.0 9999.0

        TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  18.2 9999.0   35.0    9.2 9999.0    7.7 9999.0
                  18.2 9999.0  -35.0    9.2 9999.0    8.5 9999.0

       STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  18.8  100.0    0.0 9999.0   35.1    4.5   12.6 9999.0

 ***** SHIP # 479 *****

      DIMENSION   NATH   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   5.0  479.0    2.0  548.0  360.0 9999.0   54.5   28.1    0.0 9999.0  548.0   45.0   90.0

 RUDDER, PROP     SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                9999.0  168.0    9.2   19.0 9999.0    1.0    1.0   32.0    0.0 9999.0 9999.0

        TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  15.0 9999.0   35.0   10.6 9999.0    8.8 9999.0
                  15.2 9999.0  -35.0   11.1 9999.0    9.5 9999.0

       STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  17.6  100.0    0.0 9999.0   47.5    7.2   18.5 9999.0

 ***** SHIP # 480 *****

      DIMENSION   NATH   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   5.0  480.0    2.0  424.0  330.0 9999.0   54.5   27.1    0.0 9999.0  424.0   45.0   90.0

 RUDDER, PROP     SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                9999.0  148.0    9.0   17.0 9999.0    1.0    1.0   29.4    0.0 9999.0 9999.0

        TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  15.7 9999.0   35.0   10.1 9999.0    8.3 9999.0
                  15.7 9999.0  -35.0   10.1 9999.0    8.2 9999.0

       STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  15.6  100.0    0.0 9999.0   52.9   34.3   22.7 9999.0

 ***** SHIP # 481 *****

      DIMENSION   NATH   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   5.0  481.0    2.0  149.0  330.0 9999.0   54.5   10.4   53.0 9999.0  424.0   45.0   90.0

 RUDDER, PROP     SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                9999.0  131.0    9.0   19.0 9999.0    1.0    1.0   84.5    0.0 9999.0 9999.0

        TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                  17.7 9999.0   35.0    8.1 9999.0    6.4 9999.0
                  17.7 9999.0  -35.0    8.8 9999.0    6.6 9999.0
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   STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               17.7  100.0    0.0 9999.0   16.8    0.2   13.2 9999.0

***** SHIP # 402 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   BDIS   SSHP   SRPM
                9.0  402.0 9999.0   62.0 9999.0  228.0   30.5   11.7    2.0 9999.0   62.0   18.0 9999.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
             9999.0   34.0 9999.0    7.5 9999.0 9999.0    1.0   12.0    0.0 9999.0 9999.0

   STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               16.6  100.0    0.0 9999.0   22.3 9999.0 9999.0 9999.0

***** SHIP # 403 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   BDIS   SSHP   SRPM
                9.0  403.0 9999.0   64.0 9999.0 ,228.0   31.0   11.9    0.0 9999.0   64.0   20.0 9999.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
             9999.0   29.0 9999.0    9.4 9997.0 9999.0    1.0   12.7    0.0 9999.0 9999.0

   STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               17.5  100.0    0.0 9999.0   24.0    5.0 9999.0 9999.0

***** SHIP # 404 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   BDIS   SSHP   SRPM
                7.0  434.0 9999.0   41.0 9999.0  228.0   31.0    7.9   17.0 9999.0   64.0   20.0 9999.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
             9999.0   29.0 9999.0    9.4 9999.0 9999.0    1.0   21.7    0.0 9999.0 9999.0

   STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               14.8  100.0    0.0 9999.0   17.4    1.2 9999.0 9999.0

***** SHIP # 405 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   BDIS   SSHP   SRPM
                9.0  405.0 9999.0   60.0 9999.0  228.0   31.2   11.0    3.0 9999.0   60.0   17.8 9999.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
             9999.0   38.0 9999.0    7.3 9999.0 9999.0    1.0   12.3    0.0 9999.0 9999.0

   STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               17.0  100.0    0.0 9999.0   30.0 9999.0 9999.0 9999.0

***** SHIP # 406 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   BDIS   SSHP   SRPM
                9.0  406.0 9999.0   58.0 9999.0  228.0   30.3   11.0    1.0 9999.0   58.0   18.0 9999.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
             9999.0   34.0 9999.0    7.5 9999.0 9999.0    1.0   13.3    0.0 9999.0 9999.0

   STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               16.8  100.0    0.0 9999.0   22.2 9999.0 9999.0 9999.0

***** SHIP # 407 *****
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    DIMENSION   MATH   MMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   BDIS   SSHP   SRPM
                 9.0  487.0 9999.0   66.0 9999.0  231.0   30.3   12.4    0.0 9999.0   66.0   21.0 9999.0

 RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   UNUV   TRLC
              9999.0   40.0 9999.0   15.3 9999.0 9999.0    1.0   12.3    0.0 9999.0 9999.0

      TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                16.0 9999.0   35.0    6.4 9999.0 9999.0 9999.0
                16.0 9999.0  -35.0    7.4 9999.0 9999.0 9999.0

     STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                16.7  100.0    0.0 9999.0   21.2    5.8 9999.0 9999.0

 $$$$$ SHIP # 488 $$$$$

    DIMENSION   MATH   MMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   BDIS   SSHP   SRPM
                 7.0  488.0 9999.0   68.0 9999.0  231.0   30.3   12.8    0.0 9999.0   68.0   21.0 9999.0

 RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   UNUV   TRLC
              9999.0   40.0 9999.0   10.4 9999.0 9999.0    1.0   11.2    0.0 9999.0 9999.0

      TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
              9999.0 9999.0   35.0    6.0 9999.0 9999.0 9999.0
              9999.0 9999.0  -35.0    6.6 9999.0 9999.0 9999.0

     STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
              9999.0  100.0    0.0 9999.0   15.2 9999.0 9999.0 9999.0

 $$$$$ SHIP # 489 $$$$$

    DIMENSION   MATH   MMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   BDIS   SSHP   SRPM
                 9.0  489.0 9999.0   66.0 9999.0  231.0   30.3   12.4    0.0 9999.0   66.0   21.0 9999.0

 RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   UNUV   TRLC
              9999.0   38.0 9999.0 9999.0 9999.0 9999.0    1.0   12.4    0.0 9999.0 9999.0

      TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                17.3 9999.0   35.0    6.5 9999.0 9999.0 9999.0
              9999.0 9999.0  -35.0    6.6 9999.0 9999.0 9999.0

     STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                17.3  100.0    0.0 9999.0   15.4 9999.0 9999.0 9999.0

 $$$$$ SHIP # 490 $$$$$

    DIMENSION   MATH   MMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   BDIS   SSHP   SRPM
                 9.0  490.0 9999.0   38.0 9999.0  231.0   30.3    7.4    0.0 9999.0   66.0   21.0 9999.0

 RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   UNUV   TRLC
              9999.0   38.0 9999.0 9999.0 9999.0 9999.0    1.0   23.8    0.0 9999.0 9999.0

     STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                15.3  100.0    0.0 9999.0   14.6 9999.0 9999.0 9999.0

 $$$$$ SHIP # 491 $$$$$

    DIMENSION   MATH   MMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   BDIS   SSHP   SRPM
                 9.0  491.0 9999.0   41.0 9999.0  235.0   30.6    7.8   20.0 9999.0   66.0   18.9 9999.0

 RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   UNUV   TRLC
              9999.0   70.0 9999.0 9999.0 9999.0 9999.0    3.0   21.5    0.0 9999.0 9999.0
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    STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                16.0  100.0    0.0 9999.0 9999.0 9999.0   33.0 9999.0

$$$$$ SHIP # 492 $$$$$

   DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 9.0  492.0 9999.0   66.0 9999.0  235.0   30.6   12.0    2.0 9999.0   66.0   21.4 9999.0

RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
              9999.0   70.0 9999.0 9999.0 9999.0 9999.0    3.0   11.8    0.0 9999.0 9999.0

    STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
              9999.0  100.0    0.0 9999.0 9999.0 9999.0   29.2 9999.0

$$$$$ SHIP # 493 $$$$$

   DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 9.0  493.0 9999.0   67.0 9999.0  236.0   32.1   11.6    0.0 9999.0   67.0   21.0 9999.0

RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
              9999.0   38.0 9999.0 9999.0 9999.0 9999.0    1.0   15.2    0.0 9999.0 9999.0

     TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
              9999.0 9999.0   35.0    6.9 9999.0 9999.0 9999.0
              9999.0 9999.0  -35.0    6.4 9999.0 9999.0 9999.0

    STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                17.2  100.0    0.0 9999.0 9999.0 9999.0   71.3 9999.0

$$$$$ SHIP # 494 $$$$$

   DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 9.0  494.0 9999.0   40.0 9999.0  234.0   31.0    7.0   21.0 9999.0 9999.0   15.0 9999.0

RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
              9999.0   34.0 9999.0    5.6 9999.0 9999.0    1.0   25.7    0.0 9999.0 9999.0

    STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
              9999.0  100.0    0.0 9999.0 9999.0 9999.0   23.3 9999.0

$$$$$ SHIP # 495 $$$$$

   DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 9.0  495.0 9999.0   84.0 9999.0  244.0   33.1   12.3    0.0 9999.0 9999.0   16.2 9999.0

RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
              9999.0   46.0 9999.0    7.1 9999.0 9999.0    1.0   14.5    0.0 9999.0 9999.0

     TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                17.0 9999.0   35.0    7.6 9999.0 9999.0 9999.0
                17.0 9999.0  -35.0    6.8 9999.0 9999.0 9999.0

    STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                16.0  100.0    0.0 9999.0 9999.0 9999.0   53.9 9999.0

$$$$$ SHIP # 496 $$$$$

   DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 9.0  496.0 9999.0   71.0 9999.0  244.0   31.7   11.9    0.0 9999.0   71.0   21.0 9999.0

RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
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                 9999.0   45.0 9999.0 9999.0 9999.0 9999.0    1.0   13.2    0.0 9999.0 9999.0

         TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                   15.0 9999.0   35.0    6.7 9999.0 9999.0 9999.0
                   15.0 9999.0  -35.0    7.2 9999.0 9999.0 9999.0

        STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 9999.0  100.0    0.0 9999.0 9999.0 9999.0   34.7 9999.0

***** SHIP # 497 *****

       DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                    9.0  497.0 9999.0   83.0 9999.0  244.0   35.0   12.5    0.0 9999.0   83.0   23.1 9999.0

RUDDER, PROP       SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 9999.0   45.0 9999.0 9999.0 9999.0 9999.0    1.0   18.3    0.0 9999.0 9999.0

         TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 9999.0 9999.0   35.0    6.7 9999.0 9999.0 9999.0
                 9999.0 9999.0  -35.0    7.7 9999.0 9999.0 9999.0
                 9999.0 9999.0   35.0    6.1 9999.0 9999.0 9999.0
                 9999.0 9999.0  -35.0    6.6 9999.0 9999.0 9999.0
                 9999.0 9999.0   35.0    6.6 9999.0 9999.0 9999.0
                 9999.0 9999.0  -35.0    6.6 9999.0 9999.0 9999.0

        STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                   14.0  100.0    0.0 9999.0 9999.0 9999.0   20.8 9999.0
                   15.0  100.0    0.0 9999.0 9999.0 9999.0   40.8 9999.0
                   15.0  100.0    0.0 9999.0 9999.0 9999.0   40.0 9999.0

***** SHIP # 498 *****

       DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                    9.0  498.0 9999.0   89.0 9999.0  254.0   34.8   13.0    0.0 9999.0   89.0   21.0 9999.0

RUDDER, PROP       SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 9999.0   47.0 9999.0 9999.0 9999.0 9999.0    1.0   19.1    0.0 9999.0 9999.0

         TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                   17.4 9999.0   35.0    7.0 9999.0 9999.0 9999.0
                   17.1 9999.0  -35.0    7.6 9999.0 9999.0 9999.0

        STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                   16.7  100.0    0.0 9999.0 9999.0 9999.0   28.4 9999.0

***** SHIP # 499 *****

       DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                    9.0  499.0 9999.0   99.0 9999.0  257.0   37.2   13.0    5.0 9999.0   99.0   24.3 9999.0

RUDDER, PROP       SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 9999.0   45.0 9999.0 9999.0 9999.0 9999.0    1.0   14.1    0.0 9999.0 9999.0

        STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                   16.5  100.0    0.0 9999.0 9999.0 9999.0 9999.0 9999.0

***** SHIP # 500 *****

       DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                    9.0  500.0 9999.0   95.0 9999.0  259.0   35.5   13.2    2.0 9999.0   95.0   24.0 9999.0

RUDDER, PROP       SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
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              9999.0   49.0 9999.0   10.0 9999.0 9999.0    1.0   16.1    0.0 9999.0 9999.0

     TURNING     SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 15.8 9999.0   35.0    8.2 9999.0 9999.0 9999.0
                 15.8 9999.0  -35.0    8.3 9999.0 9999.0 9999.0

    STOPPING     SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               9999.0  100.0    0.0 9999.0 9999.0   37.0 9999.0 9999.0

 ***** SHIP # 591 *****

   DIMENSION     NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  9.0  591.0 9999.0   95.0 9999.0  259.0   35.5   13.2    2.0 9999.0   95.0   24.0 9999.0

 RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               9999.0   49.0 9999.0   10.0 9999.0 9999.0    1.0   16.1    0.0 9999.0 9999.0

     TURNING     SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 15.8 9999.0   35.0    8.2 9999.0 9999.0 9999.0
                 15.8 9999.0  -35.0    8.3 9999.0 9999.0 9999.0

 ***** SHIP # 592 *****

   DIMENSION     NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  7.0  392.0 9999.0  111.0 9999.0  280.0   37.1   13.3    4.0 9999.0  111.0   26.2 9999.0

 RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               9999.0   54.0 9999.0 9999.0 9999.0 9999.0    1.0   19.2    0.0 9999.0 9999.0

    STOPPING     SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 17.4  100.0    0.0 9999.0 9999.0   34.0 9999.0 9999.0

 ***** SHIP # 593 *****

   DIMENSION     NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  9.0  593.0 9999.0   93.0 9999.0  250.0   36.6 9999.0    0.0 9999.0  109.0   18.5 9999.0

 RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               9999.0   54.0 9999.0 9999.0 9999.0 9999.0    1.0   16.2    0.0 9999.0 9999.0

     TURNING     SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               9999.0 9999.0   35.0    3.8 9999.0 9999.0 9999.0
               9999.0 9999.0  -35.0    3.8 9999.0 9999.0 9999.0

 ***** SHIP # 594 *****

   DIMENSION     NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  9.0  594.0 9999.0   58.0 9999.0  234.0   31.4    8.9   14.0 9999.0 9999.0   18.4 9999.0

 RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               9999.0   54.0 9999.0 9999.0 9999.0 9999.0    1.0   26.3    0.0 9999.0 9999.0

     TURNING     SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 17.1 9999.0   35.0    6.8 9999.0 9999.0 9999.0
                 17.1 9999.0  -35.0    7.0 9999.0 9999.0 9999.0

    STOPPING     SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 15.8  100.0    0.0 9999.0 9999.0   19.9 9999.0 9999.0

 ***** SHIP # 595 *****
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       DIMENSION    NATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                     9.0   595.0  9999.0    49.0  9999.0   254.0    31.6     7.6    11.0  9999.0  9999.0    19.4  9999.0

   RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  9999.0    59.0  9999.0  9999.0  9999.0  9999.0     1.0    29.5     0.0  9999.0  9999.0

         TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                    16.0  9999.0    35.0     5.2  9999.0  9999.0  9999.0
                    16.0  9999.0   -35.0     5.5  9999.0  9999.0  9999.0

        STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                    18.4   100.0     0.0  9999.0  9999.0    12.2  9999.0  9999.0


   ***** SHIP # 596 *****

       DIMENSION    NATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                     9.0   596.0  9999.0    61.0  9999.0   225.0    31.0    11.4     3.0  9999.0  9999.0    14.5  9999.0

   RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  9999.0    34.0  9999.0  9999.0  9999.0  9999.0     1.0    11.1     0.0  9999.0  9999.0

        STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                    16.0   100.0     0.0  9999.0  9999.0    26.5  9999.0  9999.0
                    15.0   100.0     0.0  9999.0  9999.0    22.5  9999.0  9999.0


   ***** SHIP # 597 *****

       DIMENSION    NATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                     9.0   597.0  9999.0    66.0  9999.0   237.0    31.0    11.5     3.0  9999.0    66.0    15.1  9999.0

   RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  9999.0    36.0  9999.0  9999.0  9999.0  9999.0     1.0    11.6     0.0  9999.0  9999.0

         TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                    16.0  9999.0    35.0     7.8  9999.0  9999.0  9999.0
                    16.0  9999.0   -35.0     8.8  9999.0  9999.0  9999.0
                    16.0  9999.0    35.0     6.2  9999.0  9999.0  9999.0
                    16.0  9999.0   -35.0     5.8  9999.0  9999.0  9999.0


   ***** SHIP # 598 *****

       DIMENSION    NATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                     9.0   598.0  9999.0   112.0  9999.0   264.0    37.1    14.3     5.0  9999.0  9999.0    22.4  9999.0

   RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  9999.0    54.0  9999.0  9999.0  9999.0  9999.0     1.0    15.2     0.0  9999.0  9999.0

         TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                    16.0  9999.0    35.0    10.4  9999.0  9999.0  9999.0
                    16.0  9999.0   -35.0     8.2  9999.0  9999.0  9999.0

        STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                    16.5   100.0     0.0  9999.0    21.0     1.4  9999.0  9999.0


   ***** SHIP # 599 *****

       DIMENSION    NATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                     9.0   599.0     2.0   243.0   311.0  9999.0    47.2    19.0     0.0  9999.0   243.0    28.0    85.0

   RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  9999.0    78.0     8.8    21.0  9999.0     1.0     1.0    20.2     0.0  9999.0  9999.0
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     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               15.0 9999.0   35.0   11.4 9999.0 9999.0 9999.0
               15.0 9999.0  -35.0   13.7 9999.0 9999.0 9999.0
               15.4 9999.0   35.0   10.8 9999.0 9999.0 9999.0
               10.0 9999.0  -35.0   11.0 9999.0 9999.0 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                9.0  100.0    0.0 9999.0   26.1 9999.0   20.1 9999.0
                4.2  100.0    0.0 9999.0    8.2 9999.0   10.8 9999.0
               15.9  100.0    0.0 9999.0   50.0 9999.0   22.5 9999.0

***** SHIP # 600 *****

   DIMENSION   NATH   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                9.0  600.0    2.0  132.0  242.0 9999.0   40.8   14.6    1.0 9999.0  132.0   23.1  114.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
             9999.0   55.0    7.2 9999.0 9999.0    3.0    1.0 9999.0    0.0 9999.0 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               16.7  100.0    0.0 9999.0   26.4 9999.0   10.0 9999.0

***** SHIP # 601 *****

   DIMENSION   NATH   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                9.0  601.0    2.0  124.0  262.0 9999.0   40.8   13.8    4.0 9999.0  124.0   23.1  114.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
             9999.0   55.0    7.2 9999.0 9999.0    3.0    1.0 9999.0    0.0 9999.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               16.0 9999.0   35.0 9999.0 9999.0    7.0 9999.0
             9999.0 9999.0  -35.0 9999.0 9999.0    8.7 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               14.6  100.0    0.0 9999.0   29.2 9999.0   10.8 9999.0

***** SHIP # 602 *****

   DIMENSION   NATH   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                9.0  602.0    2.0  136.0  249.0 9999.0   39.0   15.1    3.0 9999.0  136.0   23.1  114.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
             9999.0   59.0    7.2 9999.0 9999.0 9999.0    1.0 9999.0    0.0 9999.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               13.5 9999.0   35.0    9.3 9999.0 9999.0 9999.0
               13.5 9999.0  -35.0    9.8 9999.0 9999.0 9999.0

***** SHIP # 603 *****

   DIMENSION   NATH   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                9.0  603.0    2.0   95.0  269.0 9999.0   39.0   10.8   18.0 9999.0  136.0   23.1  114.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
             9999.0   59.0    7.2 9999.0 9999.0 9999.0    1.0 9999.0    0.0 9999.0 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               13.5  100.0    0.0 9999.0   32.2 9999.0   13.7 9999.0

***** SHIP # 300 *****
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   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                14.0   300.0     3.0    95.0   240.0   255.0    35.0    13.7     2.0     1.0    98.0    20.7   118.0

 RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                16.0  9999.0  9999.0    17.0     2.0     3.0     1.0    15.0     0.0     3.0     2.0

     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                16.3     5.0   -35.0     8.6     3.2     9.0  9999.0
                15.8     6.0    35.0     8.0     3.6     8.4  9999.0

***** SHIP # 301 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                14.0   301.0     3.0    58.0   240.0   255.0    35.0     8.4     4.0     1.0    58.0    20.7   118.0

 RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                17.0  9999.0  9999.0    17.0     2.0     3.0     1.0    27.0     0.0     3.0     2.0

     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                15.5     6.0    35.0     8.9     2.0     6.0  9999.0
                15.5     6.0   -35.0     7.8     1.6     6.9  9999.0

***** SHIP # 302 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                14.0   302.0     3.0    65.0   204.0   214.0    30.9    12.3     0.0     1.0    65.0    13.8   118.0

 RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                15.5  9999.0     6.4    13.8     2.0     3.0     1.0    11.0     0.0     7.0  9999.0

     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                16.0  9999.0    35.0     3.5     3.0  9999.0  9999.0
                16.0  9999.0   -35.0     3.5     3.0  9999.0  9999.0

    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TINS    TINR
                16.0   100.0     0.0    20.0    20.0  9999.0     7.0  9999.0

***** SHIP # 303 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                14.0   303.0     3.0    11.0   204.0   214.0    30.9     2.3    65.0     1.0    11.0    13.8   118.0

 RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                15.5  9999.0     6.4    13.8     2.0     3.0     1.0    29.5     0.0     7.0  9999.0

     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
                16.0  9999.0    35.0     2.0     2.0  9999.0  9999.0
                16.0  9999.0   -35.0     2.0     2.0  9999.0  9999.0

    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TINS    TINR
                16.0   100.0     0.0    14.0    14.0  9999.0     5.0  9999.0

***** SHIP # 304 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                14.0   304.0     2.0   116.0   261.0   271.0    39.0    13.4     0.0     1.0   116.0    16.9   116.0

 RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                15.4    49.0     6.7  9999.0     5.0     3.0     1.0    18.0     0.0     7.0  9999.0

     TURNING    SPDT    SPDF    RUDT    ADVT    TRNT    DIAT    FRPM
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                 15.0 9999.0   35.0     7.0     3.7 9999.0 9999.0
                 15.0 9999.0  -35.0     7.4     4.6 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS    TDIS    HRCH   SRCH   TIMS   TIMR
                 14.2  100.0    0.0  9999.0  9999.0 9999.0   11.9 9999.0

  ***** SHIP # 305 *****

     DIMENSION   NATN   NMBR   TYPE    DISP    LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 14.0  305.0    2.0   111.0   250.0  263.0   38.0   14.3    0.0    1.0  111.0   26.5  109.0

  RUDDER, PROP   SSPD   RDAR   PDIA    ASHP    RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                 16.4   60.0    7.5    12.0     2.0    1.0    1.0   14.0    0.0    1.0 9999.0

       TURNING   SPDT   SPDF   RUDT    ADVT    TRNT   DIAT   FRPM
                 17.7 9999.0   35.0     5.1     4.1 9999.0 9999.0
                 17.7 9999.0  -35.0     3.8     4.4 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS    TDIS    HRCH   SRCH   TIMS   TIMR
                 17.9  100.0    0.0  9999.0    30.9    6.0   11.0 9999.0

  ***** SHIP # 306 *****

     DIMENSION   NATN   NMBR   TYPE    DISP    LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 14.0  306.0    2.0   111.0   250.0  263.0   38.0   14.3    0.0    1.0  111.0   26.5  109.0

  RUDDER, PROP   SSPD   RDAR   PDIA    ASHP    RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                 16.4   60.0    7.5    12.0     2.0    1.0    1.0   14.0    0.0    1.0 9999.0

       TURNING   SPDT   SPDF   RUDT    ADVT    TRNT   DIAT   FRPM
                 17.7 9999.0   35.0     5.8     4.3 9999.0 9999.0
                 17.7 9999.0  -35.0     5.9     4.6 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS    TDIS    HRCH   SRCH   TIMS   TIMR
                 17.8  100.0    0.0  9999.0    27.0    5.6   11.7 9999.0

  ***** SHIP # 307 *****

     DIMENSION   NATN   NMBR   TYPE    DISP    LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 14.0  307.0    1.0    62.0   215.0  227.0   31.0   11.3    0.0    1.0   62.0   19.0  103.0

  RUDDER, PROP   SSPD   RDAR   PDIA    ASHP    RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                 16.4   44.0    7.0     9.0     2.0    1.0    1.0   12.0 9999.0    7.0 9999.0

       TURNING   SPDT   SPDF   RUDT    ADVT    TRNT   DIAT   FRPM
                 17.2 9999.0   35.0  9999.0  9999.0    6.0 9999.0
                 17.2 9999.0  -35.0  9999.0  9999.0    6.0 9999.0

      STOPPING   SPDS   SHPS   RUDS    TDIS    HRCH   SRCH   TIMS   TIMR
                 17.2  100.0    0.0  9999.0    23.0 9999.0   10.3 9999.0

  ***** SHIP # 308 *****

     DIMENSION   NATN   NMBR   TYPE    DISP    LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 14.0  308.0    1.0    62.0   215.0  227.0   31.0   11.3    0.0    1.0   62.0   19.0  103.0

  RUDDER, PROP   SSPD   RDAR   PDIA    ASHP    RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                 16.4   44.0    7.0     9.0     2.0    1.0    1.0   12.0 9999.0    2.0 9999.0

       TURNING   SPDT   SPDF   RUDT    ADVT    TRNT   DIAT   FRPM
                 17.0 9999.0   35.0  9999.0  9999.0    5.4 9999.0
                 17.0 9999.0  -35.0  9999.0  9999.0    6.5 9999.0
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     STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 17.0  100.0    0.0 9999.0   18.2 9999.0   10.3 9999.0

 ***** SHIP # 309 *****

    DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   BDIS   SSHP   SRPM
                 14.0  309.0    1.0   62.0  215.0  227.0   31.0   11.3    0.0    1.0   62.0   19.0  183.0

 RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WWWV   TRLC
                 16.4   44.0    7.0    9.0    2.0    1.0    1.0   12.0 9999.0    2.0 9999.0

      TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 17.5 9999.0   35.0 9999.0 9999.0    6.7 9999.0
                 17.5 9999.0  -35.0 9999.0 9999.0    6.7 9999.0

     STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 17.5  100.0    0.0 9999.0   17.6 9999.0    9.6 9999.0

 ***** SHIP # 310 *****

    DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   BDIS   SSHP   SRPM
                 14.0  310.0    1.0   62.0  215.0  227.0   31.0   11.3    0.0    1.0   62.0   19.0  183.0

 RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WWWV   TRLC
                 16.4   32.0    7.0    9.0    2.0    1.0    1.0   12.0 9999.0    2.0 9999.0

      TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 17.2 9999.0   35.0 9999.0 9999.0    5.6 9999.0
                 17.2 9999.0  -35.0 9999.0 9999.0    6.4 9999.0

     STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 17.2  100.0    0.0 9999.0   17.6 9999.0    9.3 9999.0

 ***** SHIP # 311 *****

    DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   BDIS   SSHP   SRPM
                 14.0  311.0    1.0   83.0  222.0  239.0   33.5   13.2    0.0    1.0   83.0   21.9  116.0

 RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WWWV   TRLC
                 17.0   48.0    6.7   21.9    2.0    1.0    1.0   13.0 9999.0    2.0 9999.0

      TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 17.6 9999.0   35.0    7.4    3.6 9999.0 9999.0
                 17.6 9999.0  -35.0    9.8    4.5 9999.0 9999.0

     STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 17.6  100.0    0.0 9999.0   36.5    3.0    3.5 9999.0

 ***** SHIP # 312 *****

    DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   BDIS   SSHP   SRPM
                 14.0  312.0    1.0   94.0  231.0  239.0   34.0   12.4    0.0    1.0   94.0   20.1  114.0

 RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WWWV   TRLC
                 16.2   32.0    7.0   20.1    2.0    1.0    1.0   14.0    0.0    4.0 9999.0

      TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 14.7 9999.0   35.0   12.0    4.5 9999.0 9999.0
                 15.2 9999.0  -35.0   12.0    4.6 9999.0 9999.0

     STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
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                 15.7  100.0    0.0 9999.0   18.5 9999.0    8.2 9999.0

***** SHIP # 313 *****

     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  9.0  313.0    2.0  241.0  311.0  325.0   47.0   19.0    0.0    1.0  241.0   28.0   85.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 15.0   78.0    8.8   21.0    2.0    2.0    1.0   19.0  -10.0    2.0    1.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 15.0 9999.0   35.0   10.4 9999.0   11.5 9999.0
                 15.0 9999.0  -35.0   12.5 9999.0   10.1 9999.0
                 10.0 9999.0   35.0   10.0 9999.0    9.3 9999.0
                 15.4 9999.0   35.0    9.8 9999.0   11.8 9999.0
                 15.0 9999.0   20.0   12.2 9999.0   12.9 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 15.9  100.0    0.0 9999.0   30.0 9999.0   22.5 9999.0
                  9.0  100.0    0.0 9999.0   26.1 9999.0   20.1 9999.0
                  4.2  100.0    0.0 9999.0    8.2 9999.0   10.7 9999.0

       ZIG-ZAG   SPDZ   RUDZ   OVS1   OVSF   OVSW   KPRM   TPRM   PERD
                 15.0   20.0   13.5   13.5 9999.0 9999.0 9999.0 9999.0

***** SHIP # 314 *****

     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  9.0  314.0    2.0  132.0  262.0  275.0   41.0   14.6    0.0    1.0  132.0   23.1  114.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 16.0   55.0    7.1 9999.0    2.0    2.0    1.0   12.0   -8.0    2.0 9999.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 16.5 9999.0   35.0 9999.0 9999.0    9.6 9999.0
                 16.5 9999.0  -35.0 9999.0 9999.0   10.2 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 16.7  100.0    0.0 9999.0   26.6 9999.0   10.3 9999.0

***** SHIP # 315 *****

     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  9.0  315.0    2.0  124.0  262.0  275.0   41.0   13.7    2.0    1.0  124.0   23.1  114.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 16.0   55.0    7.1 9999.0    2.0    2.0    1.0   12.0   -8.0    3.0 9999.0

       TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                 16.0 9999.0   35.0 9999.0 9999.0    9.6 9999.0
                 16.0 9999.0  -35.0 9999.0 9999.0   10.6 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 14.6  100.0    0.0 9999.0   29.2 9999.0   10.8 9999.0

***** SHIP # 316 *****

     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  9.0  316.0    2.0  136.0  269.0  282.0   39.0   13.7    2.0    1.0  136.0   23.1  114.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 13.5   59.0    7.1 9999.0    2.0    2.0    1.0   12.0   -8.0    3.0 9999.0
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     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               13.5 9999.0   35.0    9.2 9999.0   11.1 9999.0
               13.5 9999.0  -35.0    9.8 9999.0   10.9 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               13.5  100.0    0.0 9999.0   32.2 9999.0   13.9 9999.0

***** SHIP # 317 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                9.0  317.0    2.0  143.0  269.0  282.0   39.0   15.8    2.0    1.0  143.0   23.1  114.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               15.0   59.0    7.1 9999.0    2.0    2.0    1.0   12.0   -8.0    3.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               15.0 9999.0   35.0   10.1 9999.0   10.5 9999.0
               15.0 9999.0  -35.0   11.9 9999.0   10.5 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               15.8  100.0    0.0 9999.0   36.5 9999.0   15.5 9999.0

***** SHIP # 318 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                9.0  318.0    2.0  114.0  311.0  325.0   47.0    9.5    2.0    0.0  240.0   28.0   85.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               15.0   78.0    8.8 9999.0    2.0    2.0    1.0   25.0  -10.0    2.0 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               15.5  100.0    0.0 9999.0   29.4 9999.0   13.5 9999.0

***** SHIP # 319 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                9.0  319.0    2.0  225.0  305.0  325.0   47.0   15.6    2.0    1.0  225.0   30.4   80.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               15.5   90.0    9.1 9999.0    2.0    2.0    1.0   15.0   -9.0    3.0 9999.0

     TURNING   SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
               15.5 9999.0  -35.0    8.9 9999.0   10.1 9999.0
               16.0 9999.0   35.0    8.0 9999.0   10.4 9999.0
               16.0 9999.0  -35.0    7.5 9999.0   10.3 9999.0
               11.5 9999.0   35.0   11.0 9999.0   11.8 9999.0
               10.6 9999.0  -35.0   11.0 9999.0   12.1 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               16.0  100.0    0.0 9999.0   39.4 9999.0   15.2 9999.0

***** SHIP # 320 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                8.0  320.0    2.0  220.0  305.0 9999.0   47.0   18.3    0.0    1.0  220.0 9999.0 9999.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               16.0 9999.0    8.9 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0

     ZIG-ZAG   SPDZ   RUDZ   OVS1   OVSF   OVSW   KPRM   TPRM   PERD
               16.0   20.0   19.0   20.5 9999.0 9999.0 9999.0 9999.0
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***** SHIP @ 321 *****

    DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  8.0  321.0    2.0  120.0  305.0 9999.0   47.0   10.5    5.0    1.0  120.0 9999.0 9999.0
  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 17.0 9999.0    8.9 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0
      ZIG-ZAG    SPDZ   RUDZ   OVS1   OVSF   OVSW   KPRM   TPRM   PERD
                  8.0   10.0   20.0   21.0 9999.0 9999.0 9999.0 9999.0

***** SHIP # 322 *****

    DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  8.0  322.0    2.0  113.0  254.0 9999.0 9999.0 9999.0 9999.0 9999.0  113.0   19.0 9999.0
  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 16.3 9999.0    7.5    9.0    2.0    1.0    1.0 9999.0 9999.0 9999.0 9999.0
     STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 16.3  100.0    0.0   30.5 9999.0   14.8   12.7 9999.0

***** SHIP # 323 *****

    DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  8.0  323.0    1.0   89.0  237.0 9999.0 9999.0 9999.0 9999.0 9999.0   75.0   22.8 9999.0
  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 14.2 9999.0    6.6   19.0    2.0    3.0    1.0 9999.0 9999.0 9999.0 9999.0
     STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 14.2  100.0    0.0   20.4   17.2 9999.0    8.0 9999.0

***** SHIP # 324 *****

    DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  8.0  324.0    2.0  137.0  257.0 9999.0 9999.0 9999.0 9999.0 9999.0  116.0   28.0 9999.0
  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 17.0 9999.0    7.2 9999.0    2.0    1.0    1.0 9999.0 9999.0 9999.0 9999.0
     STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 17.0  100.0    0.0   33.4 9999.0 9999.0   13.0 9999.0

***** SHIP # 325 *****

    DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  8.0  325.0    2.0  137.0  257.0 9999.0 9999.0 9999.0 9999.0 9999.0  116.0   28.0 9999.0
  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 17.0 9999.0    7.2 9999.0    2.0    1.0    1.0 9999.0 9999.0 9999.0 9999.0
     STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 17.0  100.0    0.0   34.0 9999.0 9999.0   14.0 9999.0

***** SHIP # 376 *****

    DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  8.0  376.0    1.0   63.0  253.0 9999.0 9999.0 9999.0 9999.0 9999.0   95.0   24.0 9999.0
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[redacted]

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RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
             9999.0 9999.0    7.2 9999.0    2.0    1.0    1.0 9999.0 9999.0 9999.0 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
             9999.0  100.0    0.0   32.5 9999.0 9999.0   12.0 9999.0


***** SHIP # 377 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                8.0  377.0    2.0  111.0  253.0 9999.0 9999.0 9999.0 9999.0 9999.0   95.0   24.0 9999.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               16.3 9999.0    7.8 9999.0    2.0    1.0    1.0 9999.0 9999.0 9999.0 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               16.3  100.0    0.0   38.4 9999.0 9999.0   14.0 9999.0


***** SHIP # 378 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                8.0  378.0    1.0   71.0  253.0 9999.0 9999.0 9999.0 9999.0 9999.0   99.0   24.0 9999.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               17.0 9999.0    7.8   11.5    2.0    1.0    1.0 9999.0 9999.0 9999.0 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               17.0  100.0    0.0   30.8 9999.0 9999.0   11.0 9999.0


***** SHIP # 379 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                8.0  379.0    1.0   61.0  253.0 9999.0 9999.0 9999.0 9999.0 9999.0   99.0   24.0 9999.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               15.5 9999.0    7.8   11.5    2.0    1.0    1.0 9999.0 9999.0 9999.0 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               15.5  100.0    0.0   26.0 9999.0 9999.0   12.0 9999.0


***** SHIP # 380 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                8.0  380.0    1.0   72.0  232.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0   19.8 9999.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               16.0 9999.0    6.8   11.4    2.0    3.0    1.0 9999.0 9999.0 9999.0 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               16.0  100.0    0.0   25.0   17.2    9.5   10.7 9999.0


***** SHIP # 381 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                8.0  381.0    2.0  107.0  267.0 9999.0 9999.0 9999.0 9999.0 9999.0  110.0   21.0 9999.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
             9999.0 9999.0    7.2   21.0    2.0    3.0    1.0 9999.0 9999.0 9999.0 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
             9999.0  100.0    0.0   30.8 9999.0 9999.0   14.0 9999.0
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***** SHIP # 382 *****

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   8.0   382.0     1.0  9999.0   232.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0    17.6  9999.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                9999.0  9999.0  9999.0    17.6     2.0     3.0     1.0  9999.0  9999.0  9999.0  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                9999.0   100.0     0.0    19.0  9999.0  9999.0     7.3  9999.0

***** SHIP # 383 *****

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   8.0   383.0     1.0  9999.0   240.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0    20.7  9999.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                9999.0  9999.0     6.6    20.7     2.0     3.0     1.0  9999.0  9999.0  9999.0  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                9999.0   100.0     0.0    32.7  9999.0  9999.0    11.6  9999.0

***** SHIP # 384 *****

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   8.0   384.0     1.0    65.0   204.0  9999.0  9999.0  9999.0  9999.0  9999.0    54.0    13.8  9999.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                  16.0  9999.0     6.4    13.8     2.0     3.0     1.0  9999.0  9999.0  9999.0  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  16.0   100.0     0.0  9999.0    20.0  9999.0     7.0  9999.0

***** SHIP # 385 *****

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   8.0   385.0     1.0    11.0   204.0  9999.0  9999.0  9999.0  9999.0  9999.0    54.0    13.8  9999.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                  16.0  9999.0     6.4    13.8     2.0     3.0     1.0  9999.0  9999.0  9999.0  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  16.0   100.0     0.0  9999.0    14.2  9999.0     5.1  9999.0

***** SHIP # 386 *****

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   8.0   386.0     2.0   116.0   261.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0    15.9  9999.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                  14.2  9999.0     6.7    15.0     2.0     3.0     1.0  9999.0  9999.0  9999.0  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  14.2   100.0     0.0  9999.0  9999.0  9999.0    11.9  9999.0

***** SHIP # 387 *****

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   8.0   387.0     2.0   111.0   250.0  9999.0  9999.0  9999.0  9999.0  9999.0    92.0    26.5  9999.0
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RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                17.9  9999.0     7.5    12.0     2.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0

    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                17.9   100.0     0.0  9999.0    30.7  9999.0    11.0  9999.0


***** SHIP # 388 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 8.0   388.0     2.0    62.0   250.0  9999.0  9999.0  9999.0  9999.0  9999.0    92.0    26.5  9999.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                17.3  9999.0     7.5    12.0     2.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0

    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                17.8   100.0     0.0  9999.0    27.0  9999.0    11.7  9999.0


***** SHIP # 389 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 8.0   389.0     1.0    62.0   215.0  9999.0  9999.0  9999.0  9999.0  9999.0    49.0    19.0  9999.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                17.2  9999.0     7.0     9.0     2.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0

    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                17.2   100.0     0.0  9999.0    23.0  9999.0    10.3  9999.0


***** SHIP # 390 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 8.0   390.0     1.0    62.0   215.0  9999.0  9999.0  9999.0  9999.0  9999.0    49.0    19.0  9999.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                16.9  9999.0     7.0     9.0     2.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0

    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                16.9   100.0     0.0  9999.0    18.2  9999.0    10.3  9999.0


***** SHIP # 391 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 8.0   391.0     1.0    62.0   215.0  9999.0  9999.0  9999.0  9999.0  9999.0    49.0    19.0  9999.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                17.5  9999.0     7.0     9.0     2.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0

    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                17.5   100.0     0.0  9999.0  9999.0  9999.0     9.7  9999.0


***** SHIP # 392 *****

   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 8.0   392.0     1.0    62.0   215.0  9999.0  9999.0  9999.0  9999.0  9999.0    49.0    19.0  9999.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                17.2  9999.0     7.0     9.0     2.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0

    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                17.2   100.0     0.0  9999.0    17.6  9999.0     9.3  9999.0
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***** SHIP # 393 *****

     DIMENSION     NATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                    8.0   393.0     1.0    74.0   222.0  9999.0  9999.0  9999.0  9999.0  9999.0    64.0    21.9  9999.0

  RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                   17.6  9999.0     6.7    21.9     2.0     3.0     1.0  9999.0  9999.0  9999.0  9999.0

      STOPPING     SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                   17.6   100.0     0.0  9999.0    36.5  9999.0     3.5  9999.0

***** SHIP # 394 *****

     DIMENSION     NATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                    8.0   394.0     1.0    74.0   239.0  9999.0  9999.0  9999.0  9999.0  9999.0    76.0    20.1  9999.0

  RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                   15.7  9999.0     7.0    20.1     2.0     3.0     1.0  9999.0  9999.0  9999.0  9999.0

      STOPPING     SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                   15.7   100.0     0.0  9999.0    19.5  9999.0     8.2  9999.0

***** SHIP # 395 *****

     DIMENSION     NATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                    8.0   395.0     1.0    65.0   215.0  9999.0  9999.0  9999.0  9999.0  9999.0    53.0    13.8  9999.0

  RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                   17.5  9999.0     6.1    13.8     2.0     3.0     1.0  9999.0  9999.0  9999.0  9999.0

      STOPPING     SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                   17.5   100.0     0.0  9999.0  9999.0  9999.0  9999.0  9999.0

***** SHIP # 396 *****

     DIMENSION     NATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                    8.0   396.0     1.0    53.0   215.0  9999.0  9999.0  9999.0  9999.0  9999.0    28.0    13.8  9999.0

  RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                   17.5  9999.0     6.1    13.8     2.0     3.0     1.0  9999.0  9999.0  9999.0  9999.0

      STOPPING     SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                   17.5   100.0     0.0  9999.0  9999.0  9999.0     7.6  9999.0

***** SHIP # 397 *****

     DIMENSION     NATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                    8.0   397.0     1.0    65.0   220.0  9999.0  9999.0  9999.0  9999.0  9999.0    48.0    12.6  9999.0

  RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                   14.0  9999.0     5.7    12.6  9999.0     3.0     1.0  9999.0  9999.0  9999.0  9999.0

      STOPPING     SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                   14.0   100.0     0.0  9999.0  9999.0  9999.0    11.5  9999.0

***** SHIP # 398 *****

     DIMENSION     NATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                    8.0   398.0     1.0    39.0   220.0  9999.0  9999.0  9999.0  9999.0  9999.0    48.0    12.6  9999.0
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RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               15.0 9999.0    5.7   12.6 9999.0    3.0    1.0 9999.0 9999.0 9999.0 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               15.0  100.0    0.0 9999.0 9999.0 9999.0    4.6 9999.0

***** SHIP # 399 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                8.0  399.0    1.0   76.0  222.0 9999.0 9999.0 9999.0 9999.0 9999.0   55.0   14.4 9999.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               15.0 9999.0    6.2   12.0 9999.0    3.0    1.0 9999.0 9999.0 9999.0 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               15.0  100.0    0.0 9999.0   11.1 9999.0   13.5 9999.0

***** SHIP # 400 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                8.0  400.0    1.0   39.0  222.0 9999.0 9999.0 9999.0 9999.0 9999.0   55.0   14.4 9999.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               16.0 9999.0    6.2   12.0 9999.0    3.0    1.0 9999.0 9999.0 9999.0 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               16.0  100.0    0.0 9999.0    5.6 9999.0    9.8 9999.0

***** SHIP # 401 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                8.0  401.0    1.0   65.0  214.0 9999.0 9999.0 9999.0 9999.0 9999.0   51.0   18.9 9999.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               16.8 9999.0    6.9 9999.0 9999.0    1.0    1.0 9999.0 9999.0 9999.0 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               16.8  100.0    0.0 9999.0   20.3 9999.0    7.7 9999.0

***** SHIP # 402 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                8.0  402.0    1.0   97.0  240.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0   16.1 9999.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               16.0 9999.0    6.1   16.1 9999.0    3.0    1.0 9999.0 9999.0 9999.0 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               16.0  100.0    0.0 9999.0   27.0 9999.0    9.0 9999.0

***** SHIP # 403 *****

   DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                8.0  403.0    1.0   58.0  240.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0   16.1 9999.0

RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               16.0 9999.0    6.1   16.1 9999.0    3.0    1.0 9999.0 9999.0 9999.0 9999.0

    STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               16.0  100.0    0.0 9999.0 9999.0 9999.0    7.0 9999.0
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***** SHIP # 404 *****

    DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  8.0   404.0     1.0    76.0   222.0  9999.0  9999.0  9999.0  9999.0  9999.0    55.0    14.4  9999.0

  RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                 17.0  9999.0     6.2    12.0  9999.0     3.0     1.0  9999.0  9999.0  9999.0  9999.0

      STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 17.0   100.0     0.0  9999.0    41.0  9999.0    14.8  9999.0

***** SHIP # 405 *****

    DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  8.0   405.0     1.0    39.0   222.0  9999.0  9999.0  9999.0  9999.0  9999.0    55.0    14.4  9999.0

  RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                 17.0  9999.0     6.2    12.0  9999.0     3.0     1.0  9999.0  9999.0  9999.0  9999.0

      STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 17.0   100.0     0.0  9999.0    20.0  9999.0    10.0  9999.0

***** SHIP # 406 *****

    DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  9.0   406.0     1.0    63.0   228.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0    18.0  9999.0

  RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                 16.6  9999.0  9999.0     7.5  9999.0     3.0     1.0  9999.0  9999.0  9999.0  9999.0

      STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 16.6   100.0     0.0  9999.0    22.3  9999.0  9999.0  9999.0

***** SHIP # 407 *****

    DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  9.0   407.0     1.0    63.0   228.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0    20.0  9999.0

  RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                 17.5  9999.0  9999.0     9.4  9999.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0

      STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 17.5   100.0     0.0  9999.0    24.0     5.0  9999.0  9999.0

***** SHIP # 408 *****

    DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  9.0   408.0     1.0    41.0   228.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0    20.0  9999.0

  RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                 14.8  9999.0  9999.0     9.4  9999.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0

      STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 14.8   100.0     0.0  9999.0    17.4     1.3  9999.0  9999.0

***** SHIP # 409 *****

    DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  9.0   409.0     1.0    60.0   228.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0    17.8  9999.0
  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  17.0  9999.0  9999.0     7.3  9999.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  17.0   100.0     0.0  9999.0    10.0  9999.0  9999.0  9999.0

$$$$$ SHIP # 410 $$$$$

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   7.0   410.0     1.0    58.0   228.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0    18.0  9999.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  16.8  9999.0  9999.0     7.5  9999.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  16.8   100.0     0.0  9999.0    22.2  9999.0  9999.0  9999.0

$$$$$ SHIP # 411 $$$$$

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   9.0   411.0     1.0    58.0   230.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0    18.0  9999.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                9999.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0

$$$$$ SHIP # 412 $$$$$

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   9.0   412.0     1.0    66.0   231.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0    21.0  9999.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  16.7  9999.0  9999.0    15.3  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  16.7   100.0     0.0  9999.0    21.2  9999.0  9999.0  9999.0

$$$$$ SHIP # 413 $$$$$

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   9.0   413.0     1.0    68.0   231.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0    21.0  9999.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                9999.0  9999.0  9999.0    10.4  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                9999.0   100.0     0.0  9999.0    15.2  9999.0  9999.0  9999.0

$$$$$ SHIP # 414 $$$$$

     DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   9.0   414.0     1.0    66.0   231.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0    21.0  9999.0

  RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  17.3  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0

      STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  17.3   100.0     0.0  9999.0    15.4  9999.0  9999.0  9999.0

$$$$$ SHIP # 415 $$$$$
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     DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   9.0  415.0    1.0   66.0  235.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0   18.9 9999.0
  RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                  16.1 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0
      STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  16.1  100.0    0.0 9999.0   19.8 9999.0 9999.0 9999.0

***** SHIP # 414 *****
     DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   9.0  414.0    1.0   66.0  235.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0   21.4 9999.0
  RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0
      STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                9999.0  100.0    0.0 9999.0   17.4 9999.0 9999.0 9999.0

***** SHIP # 417 *****
     DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   9.0  417.0    1.0   67.0  236.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0   21.0 9999.0
  RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                  17.3 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0
      STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  17.3  100.0    0.0 9999.0   42.0    8.0 9999.0 9999.0

***** SHIP # 418 *****
     DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   9.0  418.0    1.0   40.0  240.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0   15.0 9999.0
  RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                9999.0 9999.0 9999.0    5.6 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0
      STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                9999.0  100.0    0.0 9999.0   14.0 9999.0 9999.0 9999.0

***** SHIP # 417 *****
     DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   9.0  419.0    1.0   40.0  240.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0   15.0 9999.0
  RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                9999.0 9999.0 9999.0    5.6 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0
      STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                9999.0  100.0    0.0 9999.0   14.0 9999.0 9999.0 9999.0

***** SHIP # 420 *****
     DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   9.0  420.0    1.0   40.0  240.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0   15.0 9999.0
  RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                9999.0 9999.0 9999.0    5.6 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0
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      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               9999.0  100.0    0.0 9999.0   14.0 9999.0 9999.0 9999.0

  ***** SHIP # 421 *****
     DIMENSION   NATH   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS    SSHP   SRPM
                  9.0  421.0 9999.0   40.0  240.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0    15.0 9999.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
               9999.0 9999.0 9999.0    5.6 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               9999.0  100.0    0.0 9999.0   14.0 9999.0 9999.0 9999.0

  ***** SHIP # 422 *****
     DIMENSION   NATH   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS    SSHP   SRPM
                  9.0  422.0 9999.0   40.0  240.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0    15.0 9999.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
               9999.0 9999.0 9999.0    5.6 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               9999.0  100.0    0.0 9999.0   14.0 9999.0 9999.0 9999.0

  ***** SHIP # 423 *****
     DIMENSION   NATH   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS    SSHP   SRPM
                  9.0  423.0 9999.0   84.0  244.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0    16.2 9999.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                 16.0 9999.0 9999.0    7.1 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 16.0  100.0    0.0 9999.0   32.3 9999.0 9999.0 9999.0

  ***** SHIP # 424 *****
     DIMENSION   NATH   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS    SSHP   SRPM
                  9.0  424.0 9999.0   71.0  244.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0    21.0 9999.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
               9999.0 9999.0 9999.0    7.1 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               9999.0  100.0    0.0 9999.0   20.8 9999.0 9999.0 9999.0

  ***** SHIP # 425 *****
     DIMENSION   NATH   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS    SSHP   SRPM
                  9.0  425.0 9999.0   62.0  225.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0    14.8 9999.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WHWV   TRLC
                 18.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 18.0  100.0    0.0 9999.0   22.5 9999.0 9999.0 9999.0

  ***** SHIP # 501 *****
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   DIMENSION    NATN   NNBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 9.0  501.0 9999.0   83.0  244.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0   23.1 9999.0
 RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WWWV   TRLC
                14.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0
    STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                14.0  100.0    0.0 9999.0   12.5    8.2 9999.0 9999.0

***** SHIP # 502 *****
   DIMENSION    NATN   NNBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 9.0  502.0 9999.0   83.0  244.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0   23.1 9999.0
 RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WWWV   TRLC
                15.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0
    STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                15.0  100.0    0.0 9999.0   24.4   10.7 9999.0 9999.0

***** SHIP # 503 *****
   DIMENSION    NATN   NNBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 9.0  503.0 9999.0   83.0  244.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0   23.1 9999.0
 RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WWWV   TRLC
                15.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0
    STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                15.0  100.0    0.0 9999.0   24.0   10.8 9999.0 9999.0

***** SHIP # 504 *****
   DIMENSION    NATN   NNBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 9.0  504.0 9999.0   89.0  234.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0   21.0 9999.0
 RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WWWV   TRLC
                16.7 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0
    STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                16.7  100.0    0.0 9999.0   17.0 9999.0 9999.0 9999.0

***** SHIP # 505 *****
   DIMENSION    NATN   NNBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 9.0  505.0 9999.0   99.0  237.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0   24.3 9999.0
 RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WWWV   TRLC
                16.5 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0
    STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                16.5  100.0    0.0 9999.0 9999.0 9999.0 9999.0 9999.0

***** SHIP # 506 *****
   DIMENSION    NATN   NNBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                 9.0  506.0 9999.0 9999.0  237.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0   24.0 9999.0
 RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WWWV   TRLC
              9999.0 9999.0 9999.0   10.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0
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      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               9999.0  100.0    0.0 9999.0   37.0 9999.0 9999.0 9999.0

***** SHIP # 507 *****
     DIMENSION   MATH   HNBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  9.0  507.0 9999.0   95.0  279.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0   24.0 9999.0
  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDGT   ENGH   PROP   LATA   LCAX   WWWV   TRLC
                 14.0 9999.0 9999.0   10.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0
      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 14.0  100.0    0.0 9999.0 9999.0 9999.0 9999.0 9999.0

***** SHIP # 508 *****
     DIMENSION   MATH   HNBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  9.0  508.0 9999.0  111.0  280.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0   26.2 9999.0
  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDGT   ENGH   PROP   LATA   LCAX   WWWV   TRLC
                 17.4 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0
      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 17.4  100.0    0.0 9999.0   34.0 9999.0 9999.0 9999.0

***** SHIP # 509 *****
     DIMENSION   MATH   HNBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  9.0  509.0 9999.0  109.0  250.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0   18.5 9999.0
  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDGT   ENGH   PROP   LATA   LCAX   WWWV   TRLC
               9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0
      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               9999.0  100.0    0.0 9999.0 9999.0 9999.0 9999.0 9999.0

***** SHIP # 510 *****
     DIMENSION   MATH   HNBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  9.0  510.0 9999.0   50.0  235.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0   18.4 9999.0
  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDGT   ENGH   PROP   LATA   LCAX   WWWV   TRLC
                 15.4 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0
      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 15.4  100.0    0.0 9999.0   17.9 9999.0 9999.0 9999.0

***** SHIP # 511 *****
     DIMENSION   MATH   HNBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  9.0  511.0 9999.0   49.0  235.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0   19.4 9999.0
  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDGT   ENGH   PROP   LATA   LCAX   WWWV   TRLC
                 18.4 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0
      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 18.4  100.0    0.0 9999.0   12.2 9999.0 9999.0 9999.0

***** SHIP # 512 *****
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      DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS    SSHP   SRPM
                   9.0  512.0 9999.0   65.0  245.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0   18.5 9999.0
   RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                  14.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0
       STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  14.0  100.0    0.0 9999.0 9999.0 9999.0 9999.0 9999.0

  ***** SHIP # 513 *****
      DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS    SSHP   SRPM
                   9.0  513.0 9999.0   39.0  225.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0   14.6 9999.0
   RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                  16.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0
       STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  16.0  100.0    0.0 9999.0   26.5 9999.0 9999.0 9999.0

  ***** SHIP # 514 *****
      DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS    SSHP   SRPM
                   9.0  514.0 9999.0   61.0  225.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0   15.1 9999.0
   RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                  15.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0
       STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  15.0  100.0    0.0 9999.0   22.8 9999.0 9999.0 9999.0

  ***** SHIP # 515 *****
      DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS    SSHP   SRPM
                   9.0  515.0 9999.0   61.0  237.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0   15.1 9999.0
   RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0
       STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                9999.0  100.0    0.0 9999.0 9999.0 9999.0 9999.0 9999.0

  ***** SHIP # 516 *****
      DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS    SSHP   SRPM
                   9.0  516.0 9999.0   66.0  237.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0   15.2 9999.0
   RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0
       STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                9999.0  100.0    0.0 9999.0 9999.0 9999.0 9999.0 9999.0

  ***** SHIP # 517 *****
      DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS    SSHP   SRPM
                   9.0  517.0 9999.0   62.0  264.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0   22.4 9999.0
   RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                  16.5 9999.0 9999.0   22.4 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0
   STOPPING     SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                16.5   100.0     0.0  9999.0    21.0     1.4  9999.0  9999.0

***** SHIP # 518 *****
   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 9.0   518.0  9999.0   121.0   278.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0    23.5  9999.0
RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
              9999.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0

***** SHIP # 519 *****
   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 8.0   519.0  9999.0    89.0   238.0  9999.0  9999.0  9999.0  9999.0  9999.0    71.0    22.0  9999.0
RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                16.8  9999.0     7.3     8.0     2.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0
   STOPPING     SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                16.8   100.0     0.0  9999.0    29.9  9999.0    11.5  9999.0

***** SHIP # 520 *****
   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 8.0   520.0  9999.0    75.0   221.0  9999.0  9999.0  9999.0  9999.0  9999.0    63.0    22.0  9999.0
RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                16.9  9999.0     7.0     8.0     2.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0
   STOPPING     SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                16.9   100.0     0.0  9999.0    16.1     9.8     9.2  9999.0

***** SHIP # 521 *****
   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 8.0   521.0  9999.0   113.0   265.0  9999.0  9999.0  9999.0  9999.0  9999.0    97.0    22.0  9999.0
RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                16.2  9999.0     8.0     6.9     2.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0
   STOPPING     SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                16.2   100.0     0.0  9999.0    25.6     9.2    13.0  9999.0

***** SHIP # 522 *****
   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 8.0   522.0  9999.0    93.0   250.0  9999.0  9999.0  9999.0  9999.0  9999.0    72.0    22.6  9999.0
RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                17.4  9999.0     7.1     8.1     2.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0
   STOPPING     SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                17.4   100.0     0.0  9999.0    35.8  9999.0    13.2  9999.0

***** SHIP # 523 *****
   DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 8.0   523.0  9999.0    66.0   220.0  9999.0  9999.0  9999.0  9999.0  9999.0    53.0    22.0  9999.0
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   RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                  17.1 9999.0    7.0    8.0    2.0    1.0    1.0 9999.0 9999.0 9999.0 9999.0

       STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  17.1  100.0    0.0 9999.0   24.6 9999.0    8.3 9999.0

 ***** SHIP # 524 *****

      DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   8.0  524.0 9999.0   49.0  229.0 9999.0 9999.0 9999.0 9999.0 9999.0   65.0   16.8 9999.0

   RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                  16.2 9999.0    6.7    7.5    2.0    1.0    1.0 9999.0 9999.0 9959.0 9999.0

       STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  16.2  100.0    0.0 9999.0   16.0 9999.0    7.6 9999.0

 ***** SHIP # 525 *****

      DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   3.0  525.0 9999.0   88.0  274.0 9999.0 9999.0 9999.0 9999.0 9999.0  117.0   25.0 9999.0

   RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                  17.2 9999.0    7.5   12.5    2.0    1.0    1.0 9999.0 9999.0 9999.0 9999.0

       STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  17.2  100.0    0.0 9999.0   24.4 9999.0    9.3 9999.0

 ***** SHIP # 526 *****

      DIMENSION   NATN   NMBR   TYPE   DISP   LBPX  -LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   8.0  526.0 9999.0   53.0  229.0 9999.0 9999.0 9999.0 9999.0 9999.0   59.0   16.8 9999.0

   RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                  15.3 9999.0    6.7    7.8    2.0    1.0    1.0 9999.0 9999.0 9999.0 9999.0

       STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  15.3  100.0    0.0 9999.0   16.1 9999.0    7.6 9999.0

 ***** SHIP # 527 *****

      DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   3.0  527.0 9999.0   60.0  248.0 9999.0 9999.0 9999.0 9999.0 9999.0   87.0   21.1 9999.0

   RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                  15.4 9999.0    6.7   11.5    2.0    1.0    1.0 9999.0 9999.0 9999.0 9999.0

       STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  14.4  100.0    0.0 9999.0   21.0 9999.0    7.8 9999.0

 ***** SHIP # 528 *****

      DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                   3.0  528.0 9999.0   87.0  287.0 9999.0 9999.0 9999.0 9999.0 9999.0  149.0   27.5 9999.0

   RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                  18.2 9999.0    7.6   12.5    2.0    1.0    1.0 9999.0 9999.0 9999.0 9999.0

       STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                  18.2  100.0    0.0 9999.0   31.6 9999.0   11.3 9999.0
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***** SHIP # 529 *****
   DIMENSION      NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   3.0   529.0  9999.0    69.0   218.0  9999.0  9999.0  9999.0  9999.0  9999.0    57.0    19.0  9999.0
RUDDER, PROP      SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  16.9  9999.0     6.9    11.5     2.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0
    STOPPING      SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  16.9   100.0     0.0  9999.0    22.5  9999.0     8.8  9999.0

***** SHIP # 530 *****
   DIMENSION      NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   8.0   530.0  9999.0    57.0   216.0  9999.0  9999.0  9999.0  9999.0  9999.0    50.0    20.3  9999.0
RUDDER, PROP      SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  17.2  9999.0     6.7     9.7     2.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0
    STOPPING      SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  17.2   100.0     0.0  9999.0    33.3  9999.0    12.0  9999.0

***** SHIP # 531 *****
   DIMENSION      NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   3.0   531.0  9999.0    60.0   213.0  9999.0  9999.0  9999.0  9999.0  9999.0    48.0    18.6  9999.0
RUDDER, PROP      SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  16.3  9999.0     6.6     8.1     2.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0
    STOPPING      SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  16.3   100.0     0.0  9999.0    18.3    11.4     9.7  9999.0

***** SHIP # 532 *****
   DIMENSION      NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   8.0   532.0  9999.0    59.0   213.0  9999.0  9999.0  9999.0  9999.0  9999.0    48.0    18.0  9999.0
RUDDER, PROP      SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  17.5  9999.0     6.6     8.0     2.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0
    STOPPING      SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  17.5   100.0     0.0  9999.0    24.2     9.4     8.5  9999.0

***** SHIP # 533 *****
   DIMENSION      NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   8.0   533.0  9999.0  9999.0   216.0  9999.0  9999.0  9999.0  9999.0  9999.0  9999.0    20.6  9999.0
RUDDER, PROP      SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                  18.0  9999.0     6.7  9999.0     2.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0
    STOPPING      SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  18.0   100.0     0.0  9999.0    18.4  9999.0     7.5  9999.0

***** SHIP # 534 *****
   DIMENSION      NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                   8.0   534.0  9999.0    46.0   230.0  9999.0  9999.0  9999.0  9999.0  9999.0    61.0    16.5  9999.0
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    RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                   15.7 9999.0    5.5    4.4    2.0    1.0    1.0 9999.0 9999.0 9999.0 9999.0

        STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                   15.7  100.0    0.0 9999.0 9999.0 9999.0    8.1 9999.0

   ***** SHIP # 535 *****

       DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                    8.0  535.0 9999.0   43.0  225.0 9999.0 9999.0 9999.0 9999.0 9999.0   56.0   18.9 9999.0
    RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                   17.2 9999.0    6.7   14.4    2.0    1.0    1.0 9999.0 9999.0 9999.0 9999.0

        STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                   17.2  100.0    0.0 9999.0   21.7 9999.0    6.5 9999.0

   ***** SHIP # 536 *****

       DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                    8.0  536.0 9999.0   45.0  213.0 9999.0 9999.0 9999.0 9999.0 9999.0   53.0   13.8 9999.0
    RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                   15.4 9999.0    6.4    6.3    2.0    1.0    1.0 9999.0 9999.0 9999.0 9999.0

        STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                   15.4  100.0    0.0 9999.0   17.3 9999.0    7.2 9999.0

   ***** SHIP # 537 *****

       DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                    8.0  537.0 9999.0   42.0  216.0 9999.0 9999.0 9999.0 9999.0 9999.0   53.0   13.8 9999.0
    RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                   16.2 9999.0    6.4    6.1    2.0    1.0    1.0 9999.0 9999.0 9999.0 9999.0

        STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                   16.2  100.0    0.0 9999.0   21.4 9999.0    8.8 9999.0

   ***** SHIP # 538 *****

       DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                    8.0  538.0 9999.0  139.0  272.0 9999.0 9999.0 9999.0 9999.0 9999.0  110.0   42.0 9999.0
    RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                   19.0 9999.0    6.7   15.0    2.0    1.0    1.0 9999.0 9999.0 9999.0 9999.0

        STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                   19.0  100.0    0.0 9999.0   22.6 9999.0    8.7 9999.0

   ***** SHIP # 539 *****

       DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                    8.0  539.0 9999.0   88.0  250.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0   22.7 9999.0
    RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                   16.8 9999.0    7.0    8.1    2.0    1.0    1.0 9999.0 9999.0 9999.0 9999.0

        STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                   16.8  100.0    0.0 9999.0   24.2 9999.0    9.7 9999.0
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***** SHIP # 540 *****
       DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                    8.0  540.0 9999.0   66.0  219.0 9999.0 9999.0 9999.0 9999.0 9999.0   54.0   17.0 9999.0
    RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 9999.0 9999.0    6.6 9999.0    2.0    1.0    1.0 9999.0 9999.0 9999.0 9999.0
        STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 9999.0  100.0    0.0 9999.0 9999.0 9999.0 9999.0 9999.0

***** SHIP # 541 *****
       DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                    8.0  541.0 9999.0   30.0  205.0 9999.0 9999.0 9999.0 9999.0 9999.0   53.0   12.8 9999.0
    RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                   16.4 9999.0    6.0   10.9    2.0    3.0    1.0 9999.0 9999.0 9999.0 9999.0
        STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                   16.4  100.0    0.0 9999.0   18.8 9999.0    7.6 9999.0

***** SHIP # 542 *****
       DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                    8.0  542.0 9999.0   29.0  216.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0   17.6 9999.0
    RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 9999.0 9999.0    6.2   15.3    2.0    3.0    1.0 9999.0 9999.0 9999.0 9999.0
        STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 9999.0  100.0    0.0 9999.0 9999.0 9999.0 9999.0 9999.0

***** SHIP # 543 *****
       DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                    8.0  543.0 9999.0   80.0  224.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0   19.0 9999.0
    RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                   16.4 9999.0    6.8 9999.0    2.0    1.0    1.0 9999.0 9999.0 9999.0 9999.0
        STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                   16.4  100.0    0.0 9999.0   30.2 9999.0   11.2 9999.0

***** SHIP # 544 *****
       DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                    8.0  544.0 9999.0   43.0  224.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0   19.0 9999.0
    RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                   17.7 9999.0    6.8 9999.0    2.0    1.0    1.0 9999.0 9999.0 9999.0 9999.0
        STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                   17.7  100.0    0.0 9999.0   22.3 9999.0    8.3 9999.0

***** SHIP # 545 *****
       DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                    8.0  545.0 9999.0   48.0  239.0 9999.0 9999.0 9999.0 9999.0 9999.0 9999.0   20.0 9999.0
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   RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                    17.0  9999.0     7.1  9999.0     2.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0

       STOPPING     SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                    17.0   100.0     0.0  9999.0    19.3  9999.0     8.0  9999.0

  ***** SHIP # 546 *****

      DIMENSION     NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                     8.0   546.0  9999.0    92.0   250.0  9999.0  9999.0  9999.0  9999.0  9999.0    72.0    23.0  9999.0

   RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                    17.4  9999.0     7.0     8.0     2.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0

       STOPPING     SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                    17.4   100.0     0.0  9999.0    38.5    11.5    24.0  9999.0

  ***** SHIP # 547 *****

      DIMENSION     NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                     9.0   547.0  9999.0   140.0   260.0  9999.0  9999.0  9999.0  9999.0  9999.0   118.0    26.0  9999.0

   RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                    15.8  9999.0     7.0    10.0     2.0     3.0     1.0  9999.0  9999.0  9999.0  9999.0

       STOPPING     SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                    15.8   100.0     0.0  9999.0    48.8    10.0    14.7  9999.0

  ***** SHIP # 548 *****

      DIMENSION     NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                     8.0   548.0  9999.0   121.0   245.0  9999.0  9999.0  9999.0  9999.0  9999.0   104.0    24.0  9999.0

   RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                    16.6  9999.0     6.9     8.7     2.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0

       STOPPING     SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                    16.6   100.0     0.0  9999.0    40.3    16.7    13.9  9999.0

  ***** SHIP # 549 *****

      DIMENSION     NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                     8.0   549.0  9999.0   146.0   255.0  9999.0  9999.0  9999.0  9999.0  9999.0   125.0    23.0  9999.0

   RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                    14.5  9999.0     6.7  9999.0     2.0     3.0     1.0  9999.0  9999.0  9999.0  9999.0

       STOPPING     SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                    14.5   100.0     0.0  9999.0    35.9     6.6    14.6  9999.0

  ***** SHIP # 550 *****

      DIMENSION     NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                     8.0   550.0  9999.0    85.0   235.0  9999.0  9999.0  9999.0  9999.0  9999.0    70.0    19.5  9999.0

   RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                    16.4  9999.0     6.4    14.0     2.0     3.0     1.0  9999.0  9999.0  9999.0  9999.0

       STOPPING     SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                    16.4   100.0     0.0  9999.0    40.6     5.4    14.5  9999.0
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***** SHIP # 551 *****

     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  8.0  551.0 9999.0  125.0  262.0 9999.0 9999.0 9999.0 9999.0 9999.0  112.0   23.8 9999.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 17.2 9999.0    7.1    8.3    2.0    1.0    1.0 9999.0 9999.0 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 17.2  100.0    0.0 9999.0    6.5 9999.0    6.0 9999.0

***** SHIP # 552 *****

     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  8.0  552.0 9999.0  102.0  239.0 9999.0 9999.0 9999.0 9999.0 9999.0   80.0   20.7 9999.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 16.9 9999.0    6.4 9999.0    2.0    3.0    1.0 9999.0 9999.0 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 16.9  100.0    0.0 9999.0   37.7   19.5   12.7 9999.0

***** SHIP # 553 *****

     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  8.0  553.0 9999.0   83.0  232.0 9999.0 9999.0 9999.0 9999.0 9999.0   68.0   20.7 9999.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
               9999.0 9999.0    6.7   10.4    2.0    3.0    1.0 9999.0 9999.0 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
               9999.0  100.0    0.0 9999.0 9999.0 9999.0 9999.0 9999.0

***** SHIP # 554 *****

     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  8.0  554.0 9999.0  103.0  234.0 9999.0 9999.0 9999.0 9999.0 9999.0   85.0   20.7 9999.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 17.0 9999.0    6.6   10.4    2.0    3.0    1.0 9999.0 9999.0 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 17.0  100.0    0.0 9999.0   29.4    6.0   11.5 9999.0

***** SHIP # 555 *****

     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  8.0  555.0 9999.0  122.0  246.0 9999.0 9999.0 9999.0 9999.0 9999.0  101.0   23.0 9999.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 16.2 9999.0    6.8    7.4    2.0    3.0    1.0 9999.0 9999.0 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 16.2  100.0    0.0 9999.0   27.0   12.0   13.0 9999.0

***** SHIP # 556 *****

     DIMENSION   NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                  8.0  556.0 9999.0  143.0  263.0 9999.0 9999.0 9999.0 9999.0 9999.0  119.0   27.6 9999.0
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  RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
               9999.0  9999.0     7.0    11.4     2.0     3.0     1.0  9999.0  9999.0  9999.0  9999.0

      STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
               9999.0   100.0     0.0  9999.0  9999.0  9999.0  9999.0  9999.0

***** SHIP # 557 *****

     DIMENSION   NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  8.0   557.0  9999.0   154.0   274.0  9999.0  9999.0  9999.0  9999.0  9999.0   120.0    27.6  9999.0

  RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                 16.8  9999.0     7.0    11.4     2.0     3.0     1.0  9999.0  9999.0  9999.0  9999.0

      STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 16.8   100.0     0.0  9999.0    24.0    22.0    13.2  9999.0

***** SHIP # 558 *****

     DIMENSION   NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  8.0   558.0  9999.0    28.0   213.0  9999.0  9999.0  9999.0  9999.0  9999.0    51.0    16.0  9999.0

  RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                 17.6  9999.0     6.6     6.0     2.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0

      STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 17.6   100.0     0.0  9999.0    18.4     2.7     6.4  9999.0

***** SHIP # 559 *****

     DIMENSION   NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  8.0   559.0  9999.0    71.0   215.0  9999.0  9999.0  9999.0  9999.0  9999.0    60.0    18.4  9999.0

  RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                 17.2  9999.0     6.6    18.4     2.0     3.0     1.0  9999.0  9999.0  9999.0  9999.0

      STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 17.2   100.0     0.0  9999.0    22.0     9.0     7.9  9999.0

***** SHIP # 560 *****

     DIMENSION   NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  8.0   560.0  9999.0    34.0   216.0  9999.0  9999.0  9999.0  9999.0  9999.0    62.0    17.6  9999.0

  RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                 17.2  9999.0     6.2    17.6     2.0     3.0     1.0  9999.0  9999.0  9999.0  9999.0

      STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 17.2   100.0     0.0  9999.0    15.7     2.3     5.7  9999.0

***** SHIP # 561 *****

     DIMENSION   NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  8.0   561.0  9999.0   244.0   326.0  9999.0  9999.0  9999.0  9999.0  9999.0   208.0    33.0  9999.0

  RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WNWV    TRLC
                 16.6  9999.0     7.8  9999.0     2.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0

      STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 16.6   100.0     0.0  9999.0    35.1    26.4    20.9  9999.0
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***** SHIP # 562 *****

     DIMENSION   NATH   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS    SSHP   SRPM
                  8.0  562.0 9999.0  208.0  310.0 9999.0 9999.0 9999.0 9999.0 9999.0  176.0    28.0 9999.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 15.9 9999.0    8.8 9999.0    2.0    1.0    1.0 9999.0 9999.0 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 15.9  100.0    0.0 9999.0   26.8   12.9   19.4 9999.0

***** SHIP # 563 *****

     DIMENSION   NATH   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS    SSHP   SRPM
                  8.0  563.0 9999.0  183.0  290.0 9999.0 9999.0 9999.0 9999.0 9999.0  154.0    30.0 9999.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 16.8 9999.0    7.8 9999.0    2.0    1.0    1.0 9999.0 9999.0 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 16.8  100.0    0.0 9999.0   36.8   10.1   15.7 9999.0

***** SHIP # 564 *****

     DIMENSION   NATH   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS    SSHP   SRPM
                  8.0  564.0 9999.0  112.0  264.0 9999.0 9999.0 9999.0 9999.0 9999.0   97.0    22.0 9999.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 16.2 9999.0    8.0    6.9    2.0    1.0    1.0 9999.0 9999.0 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 16.2  100.0    0.0 9999.0   26.5    9.7   13.0 9999.0

***** SHIP # 565 *****

     DIMENSION   NATH   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS    SSHP   SRPM
                  8.0  565.0 9999.0  100.0  243.0 9999.0 9999.0 9999.0 9999.0 9999.0   82.0    24.0 9999.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 16.4 9999.0    7.0 9999.0    2.0    1.0    1.0 9999.0 9999.0 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 16.4  100.0    0.0 9999.0   24.6   10.1   12.6 9999.0

***** SHIP # 566 *****

     DIMENSION   NATH   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS    SSHP   SRPM
                  8.0  566.0 9999.0   34.0  213.0 9999.0 9999.0 9999.0 9999.0 9999.0   57.0    15.0 9999.0

  RUDDER, PROP   SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                 16.4 9999.0    6.0 9999.0    2.0    1.0    1.0 9999.0 9999.0 9999.0 9999.0

      STOPPING   SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                 16.4  100.0    0.0 9999.0   21.5    3.6    8.3 9999.0

***** SHIP # 567 *****

     DIMENSION   NATH   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS    SSHP   SRPM
                  8.0  567.0 9999.0  143.0  256.0 9999.0 9999.0 9999.0 9999.0 9999.0  124.0    24.0 9999.0
```

BEST DOCUMENT AVAILABLE

```
     RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                     15.5  9999.0     7.2     8.8     2.0     3.0     1.0  9999.0  9999.0  9999.0  9999.0

         STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                     15.5   100.0     0.0  9999.0    21.3    17.3    14.4  9999.0

  ***** SHIP # 568 *****

        DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                      8.0   568.0  9999.0    71.0   256.0  9999.0  9999.0  9999.0  9999.0  9999.0   124.0    24.0  9999.0

     RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                     17.7  9999.0     7.2     8.8     2.0     3.0     1.0  9999.0  9999.0  9999.0  9999.0

         STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                     17.7   100.0     0.0  9999.0    28.1     5.0    11.2  9999.0

  ***** SHIP # 569 *****

        DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                      8.0   569.0  9999.0    37.0   224.0  9999.0  9999.0  9999.0  9999.0  9999.0    68.0    18.4  9999.0

     RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                     17.0  9999.0     6.2    18.4     2.0     3.0     1.0  9999.0  9999.0  9999.0  9999.0

         STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                     17.0   100.0     0.0  9999.0    14.3     2.0     5.3  9999.0

  ***** SHIP # 570 *****

        DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                      8.0   570.0  9999.0    66.0   220.0  9999.0  9999.0  9999.0  9999.0  9999.0    54.0    13.4  9999.0

     RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                     14.5  9999.0     6.6     5.4     2.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0

         STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                     14.5   100.0     0.0  9999.0    14.1    11.3     9.0  9999.0

  ***** SHIP # 571 *****

        DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                      8.0   571.0  9999.0   244.0   310.0  9999.0  9999.0  9999.0  9999.0  9999.0   207.0    28.0  9999.0

     RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                     15.9  9999.0     8.8    13.4     2.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0

         STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                     15.9   100.0     0.0  9999.0    44.7     6.9    22.5  9999.0

  ***** SHIP # 572 *****

        DIMENSION    NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                      8.0   572.0  9999.0    83.0   226.0  9999.0  9999.0  9999.0  9999.0  9999.0    68.0    20.0  9999.0

     RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                     14.4  9999.0     7.0     8.0     2.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0

         STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                     14.4   100.0     0.0  9999.0    15.9    11.1    10.7  9999.0
```

```
***** SHIP # 573 *****

   DIMENSION     NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  8.0   573.0  9999.0   111.0   250.0  9999.0  9999.0  9999.0  9999.0  9999.0    92.0    24.1  9999.0

RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                 16.5  9999.0     7.5    12.0     2.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0

    STOPPING     SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 16.5   100.0     0.0  9999.0    33.4  9999.0    12.0  9999.0

***** SHIP # 574 *****

   DIMENSION     NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  8.0   574.0  9999.0    84.0   232.0  9999.0  9999.0  9999.0  9999.0  9999.0    71.0    17.0  9999.0

RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                 16.3  9999.0     6.4    12.0     2.0     3.0     1.0  9999.0  9999.0  9999.0  9999.0

    STOPPING     SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 16.3   100.0     0.0  9999.0    26.6  9999.0    11.5  9999.0

***** SHIP # 575 *****

   DIMENSION     NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  8.0   575.0  9999.0   109.0   257.0  9999.0  9999.0  9999.0  9999.0  9999.0    87.0    29.4  9999.0

RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                 17.9  9999.0     7.2    20.0     2.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0

    STOPPING     SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 17.9   100.0     0.0  9999.0    33.0     5.5    12.5  9999.0

***** SHIP # 576 *****

   DIMENSION     NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  8.0   576.0  9999.0   133.0   253.0  9999.0  9999.0  9999.0  9999.0  9999.0   117.0    18.0  9999.0

RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                 13.6  9999.0     6.7    16.0     2.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0

    STOPPING     SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 13.6   100.0     0.0  9999.0    25.8  9999.0    11.5  9999.0

***** SHIP # 577 *****

   DIMENSION     NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  8.0   577.0  9999.0   237.0   310.0  9999.0  9999.0  9999.0  9999.0  9999.0   203.0    20.0  9999.0

RUDDER, PROP     SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                 15.5  9999.0     8.8    14.0     2.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0

    STOPPING     SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                 15.5   100.0     0.0  9999.0    35.9  9999.0    15.6  9999.0

***** SHIP # 578 *****

   DIMENSION     NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                  8.0   578.0  9999.0    79.0   243.0  9999.0  9999.0  9999.0  9999.0  9999.0    74.0    20.7  9999.0
```

[redacted]

```
   RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                  15.9  9999.0  9999.0    20.0     2.0     3.0     1.0  9999.0  9999.0  9999.0  9999.0

       STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  15.9   100.0     0.0  9999.0    23.8  9999.0     8.8  9999.0

***** SHIP # 579 *****

      DIMENSION   NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    BDIS    SSHP    SRPM
                   8.0   579.0  9999.0    64.0   206.0  9999.0  9999.0  9999.0  9999.0  9999.0    52.0    18.0  9999.0
   RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                  18.0  9999.0     6.7     9.8     2.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0
       STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  18.0   100.0     0.0  9999.0    18.0    11.0    11.0  9999.0

***** SHIP # 580 *****

      DIMENSION   NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    BDIS    SSHP    SRPM
                   8.0   580.0  9999.0    98.0   233.0  9999.0  9999.0  9999.0  9999.0  9999.0    82.0    24.3  9999.0
   RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                  16.5  9999.0     7.4    12.0     2.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0
       STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  16.5   100.0     0.0  9999.0    26.7    10.4    12.3  9999.0

***** SHIP # 581 *****

      DIMENSION   NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    BDIS    SSHP    SRPM
                   8.0   581.0  9999.0   220.0   305.0  9999.0  9999.0  9999.0  9999.0  9999.0   193.0    39.1  9999.0
   RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                  16.0  9999.0     8.9  9999.0     2.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0
       STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  16.0   100.0     0.0  9999.0    43.8  9999.0    17.4  9999.0

***** SHIP # 582 *****

      DIMENSION   NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    BDIS    SSHP    SRPM
                   8.0   582.0  9999.0    69.0   226.0  9999.0  9999.0  9999.0  9999.0  9999.0    60.0    17.0  9999.0
   RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                  16.0  9999.0     6.6    17.0     2.0     3.0     1.0  9999.0  9999.0  9999.0  9999.0
       STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  16.0   100.0     0.0  9999.0    23.0  9999.0     8.3  9999.0

***** SHIP # 583 *****

      DIMENSION   NATN    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    BDIS    SSHP    SRPM
                   8.0   583.0  9999.0   101.0   250.0  9999.0  9999.0  9999.0  9999.0  9999.0    83.0    26.1  9999.0
   RUDDER, PROP   SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WHWV    TRLC
                  16.4  9999.0     7.5    12.0     2.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0
       STOPPING   SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                  16.4   100.0     0.0  9999.0    31.3    10.4    11.3  9999.0
```

```
***** SHIP # 504 *****

   DIMENSION    MATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 0.0   504.0  9999.0    67.0   215.0  9999.0  9999.0  9999.0  9999.0  9999.0    50.0    19.0  9999.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WWWV    TRLC
              9999.0  9999.0     7.0     8.0     2.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0

    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
              9999.0  9999.0     0.0  9999.0    34.4    11.2     9.0  9999.0

***** SHIP # 505 *****

   DIMENSION    MATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 1.0   505.0  9999.0   143.0   269.0  9999.0    39.0    13.9     1.0  9999.0   143.0    23.1  9999.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WWWV    TRLC
                15.0  9999.0  9999.0    23.0     2.0     3.0     1.0  9999.0  9999.0  9999.0  9999.0

     TURNING    SPDT    SPSF    RUDT    ADVT    TRNT    DIAT    FRPM
                15.0  9999.0    35.0    10.0  9999.0    11.0  9999.0
                15.0  9999.0   -35.0    11.0  9999.0    12.0  9999.0

***** SHIP # 506 *****

   DIMENSION    MATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 1.0   506.0  9999.0   101.0   249.0  9999.0    39.0    11.5    10.0  9999.0   101.0    23.1  9999.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WWWV    TRLC
                15.0  9999.0  9999.0    23.0     2.0     3.0     1.0  9999.0  9999.0  9999.0  9999.0

    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                15.0   100.0     0.0  9999.0    36.5  9999.0    15.5  9999.0

***** SHIP # 507 *****

   DIMENSION    MATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 1.0   507.0  9999.0   240.0   311.0  9999.0    47.0    18.9     2.0  9999.0   240.0    28.0  9999.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WWWV    TRLC
                15.0  9999.0  9999.0    13.7     2.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0

    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                15.1   100.0     0.0  9999.0  9999.0  9999.0    23.5  9999.0
                14.6   100.0     0.0  9999.0  9999.0  9999.0    17.0  9999.0

***** SHIP # 508 *****

   DIMENSION    MATH    NMBR    TYPE    DISP    LBPX    LOAX    BEAM    DRFT    TRIM    BULB    DDIS    SSHP    SRPM
                 1.0   508.0  9999.0   115.0   311.0  9999.0    47.0     9.6    32.0  9999.0   115.0    28.0  9999.0

RUDDER, PROP    SSPD    RDAR    PDIA    ASHP    RDST    ENGN    PROP    LATA    LCAX    WWWV    TRLC
                15.0  9999.0  9999.0    13.7     2.0     1.0     1.0  9999.0  9999.0  9999.0  9999.0

    STOPPING    SPDS    SHPS    RUDS    TDIS    HRCH    SRCH    TIMS    TIMR
                15.5   100.0     0.0  9999.0    29.4  9999.0    13.5  9999.0

***** SHIP # 509 *****
```

[redacted]

```
      DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                    1.0  587.0 9999.0  225.0  305.0 9999.0   47.0   18.4    2.0 9999.0  225.0   30.4 9999.0

   RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST   ENGN   PROP   LATA   LCAX   WNWV   TRLC
                   15.0 9999.0 9999.0   22.8    2.0    1.0    1.0 9999.0 9999.0 9999.0 9999.0

        TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                   11.5 9999.0   35.0   10.0 9999.0   11.2 9999.0
                   13.5 9999.0  -35.0    8.2 9999.0    9.0 9999.0
                   10.6 9999.0  -35.0   10.0 9999.0   11.0 9999.0

       STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                   16.0  100.0    0.0 9999.0   39.4 9999.0   15.2 9999.0
                   17.0  100.0    0.0 9999.0   81.5 9999.0   51.0 9999.0

***** SHIP # 590 *****

      DIMENSION    NATN   NMBR   TYPE   DISP   LBPX   LOAX   BEAM   DRFT   TRIM   BULB   DDIS   SSHP   SRPM
                    1.0  590.0 9999.0  123.0  305.0 9999.0   47.0   10.5    5.0 9999.0  123.0   20.4 9999.0

   RUDDER, PROP    SSPD   RDAR   PDIA   ASHP   RDST . ENGN   PROP   LATA   LCAX   WNWV   TRLC
                   15.0 9999.0 9999.0   22.8    2.0    1.0    1.0 9999.0 9999.0 9999.0 9999.0

        TURNING    SPDT   SPDF   RUDT   ADVT   TRNT   DIAT   FRPM
                   16.0 9999.0   35.0    8.0 9999.0    9.0 9999.0
                   16.0 9999.0   35.0    7.5 9999.0    9.5 9999.0

       STOPPING    SPDS   SHPS   RUDS   TDIS   HRCH   SRCH   TIMS   TIMR
                   16.0  100.0    0.0 9999.0   24.7 9999.0   11.3 9999.0
```

APPENDIX F
DESCRIPTION OF THE SHIP MANEUVERING DATA BASE AND DATA BASE PROGRAMS

APPENDIX F

The ship maneuvering data base described in the text is contained in, and manipulated by, a package of three main computer programs. These programs are especially tailored to ship maneuvering performance and were developed in lieu of using an existing, generalized data base management program.

These programs were developed for use on PDP 11/34 and 11/44 computers and can be used on the Coast Guare 11/34 computers. Plots are prepared with a TEKTRONIX terminal and "Easy Graph" software package which are used by the Coast Guard with the PDP 11/34 computer.

F-1 Data Base Programs

The three programs are designated SMDB, SMPLT and STAT. The programs are coupled through disk files. SMDB can generate disk files accessed by STAT and both SMPLT and STAT can generate disk files that can be accessed by a TEKTRONIX "Easy Graph" plotting package which is used in conjunction with the PDP 11 Series computer. The general functions of the three programs are described below. Program Listings and User's Manuals are provided at the end of this Appendix.

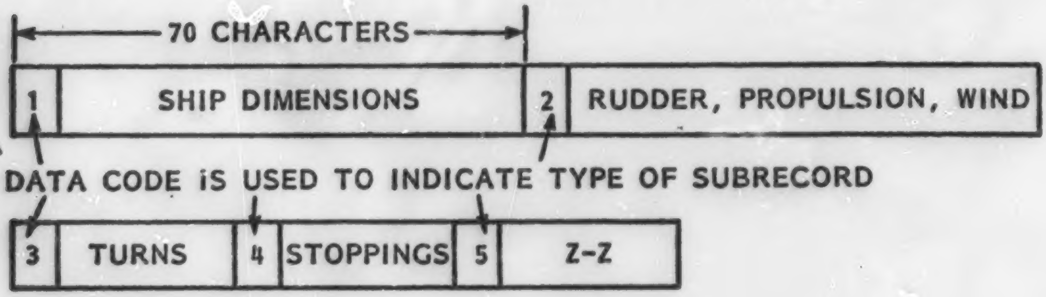
Program SMDB - SMDB is a computer program designed to access a file of ship maneuverability data (SMDB.DAT) and to select ships by certain criteria. The data for these ships can be listed and/or filed for further study or manipulation.

The program can check the validity of the input data formats, upper and lower bounds of each item, list the selected data with proper heading, print a data name dictionary, sort maneuvering data in the turning, stopping then zig-zag order. The SELECT OPTION can find ship data which meets limits or criteria specified by the user, show the number of data found meeting these criteria, list this data, and file these data under a name assigned by the user.

Program SMPLT - SMPLT creates disk files of ship maneuverability data for input to PLOT5, the Tecktronix "Easy Graph" package or program STAT. This input data comes from a file created by the program SMDB. SMPLT selects

TABLE F1

ORGANIZATION OF SHIP MANEUVERING PERFORMANCE DATA FILE


70 CHARACTERS
1
SHIP DIMENSIONS
2
RUDDER, PROPULSION, WIND
DATA CODE IS USED TO INDICATE TYPE OF SUBRECORD
3
TURNS
4
STOPPINGS
5
Z-Z

Each subrecord contains 70 characters

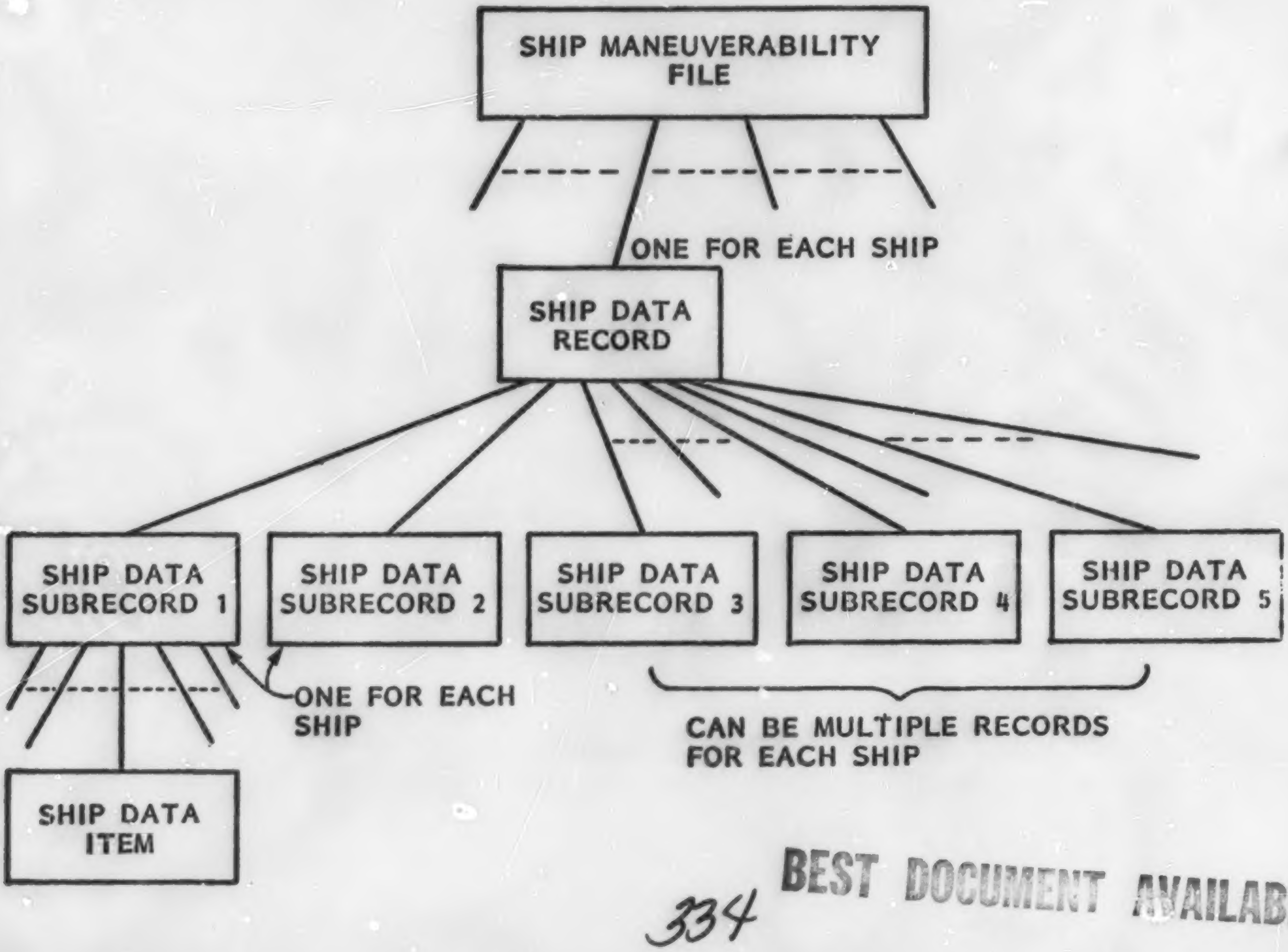

SHIP MANEUVERABILITY FILE
ONE FOR EACH SHIP
SHIP DATA RECORD
SHIP DATA SUBRECORD 1
SHIP DATA SUBRECORD 2
SHIP DATA SUBRECORD 3
SHIP DATA SUBRECORD 4
SHIP DATA SUBRECORD 5
ONE FOR EACH SHIP
CAN BE MULTIPLE RECORDS FOR EACH SHIP
SHIP DATA ITEM

TABLE F2
SHIP MANEUVERING PERFORMANCE DATA FORMAT

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Item	Data Code	Ship Nationality	Ship No.	Type of Ship	Disp.	LBP	LOA	Beam	Draft	Trim	Bulb	Design Disp.	Service SHP	Service RPM

	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)
Item	Data Code	Service Speed	Rudder Area	Prop. Diam.	Ast. SHP	Rudder/ Stern Code	Engine Code	Prop/ Rudder Code	Lateral Wind Area	Wind LCA	Wind/ Wave Cod3	Trial Code

Maneuver Turning Circle

	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)
Item	Data Code	Approach Speed	Final Speed	Rudder Angle	Advance	Transfer	Tactical Diam.	Final RPM

Maneuver Stopping

	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)
Item	Data Code	Approach Speed	% Astern SHP	Rudder Command	Track Distance	Head Reach	Side Reach	Time to Stop	Time to RPM = 0

Maneuver Zig-Zag

	(44)	(45)	(46)	(47)	(48)	(49)	(50)	(51)	(52)
Item	Data Code	Approach Speed	Rudder Angle	First Overshoot	Final Overshoot	Overshoot Width	K'*	T'*	Period

* These are the Motora/Norrbin zig-zag parameters

[redacted]

from the file the desired ship parameters and files them separately in a format that can be accessed by PLOTS, or STAT.

Program STAT - STAT performs a least square curve fit for parameters selected by the program SMPLT. Mean square error, standard derivation, slope, intersection, mean from fitted curve, and interpolated values are also calculated as part of this curve fit. STAT will curve fit data using all polynomials from first order to the highest order specified by the user. It can also be used to change, delete and list data points for the curve fit. It also stores data for input to PLOT5, Tektronix's "Easy Graph" package.

F-2 Description of Data Contained in Files

The general organization and structure of the ship maneuvering data file is outlined in Table F-1. The file consists of a set of individual ship data records (one for each ship and distinct ship loading condition for which maneuvering trials data exist). Each ship data record consists of a number of subrecords. For each ship there must be one subrecord each of types 1 and 2 (ship dimensions and rudder/propulsion/wind data, respectively). There may be any number of subrecords 3, 4 and/or 5 for each ship, but there must be at least one of these subrecords. Subrecords 3, 4 and 5 provide data for turning, stopping and zig-zag or Z maneuvers, respectively.

The particular data contained in subrecords 1 to 5 is described in Table F-2. A detailed explanation of the data coding for these subrecords is given in Table F-3. Details of data formats, etc., are given in the following sections.

TABLE F-3
EXPLANATION OF DATA FILE CODING

Explanations of Item Codings: Each subrecord contains 70 characters. The data format is (I2,13F6.1) for each subrecord. The integer field is designated for subrecord data codes.

Right justified numbering is assumed in filling out the codes Enter 9999. for unknown or missing data.

(A) Ship Dimensions Subrecord
  (1) Data Code:
    1. New ship record starts, dimension subrecord
    2. Rudder, Propulsion and Wind, Wave subrecord
    3. Turning Circle subrecord
    4. Stopping subrecord
    5. Zig-Zag subrecord

  (2) Ship Nationality Code:
  (NATN)*

01	United States
02	Soviet Union
03	Sweden
04	Norway
05	Japan
06	Denmark
07	Finland
08	United Kingdom
09	France
10	Canada
11	Liberia
12	Panama
13	Australia
14	Federal Republic of Germany (West Germany)
15	German Democratic Republic (East Germany)
16	Poland
17	Italy
18	Korea
19	Spain
20	Greece
21	Algeria
22	People's Republic of China (Mainland)
23	Republic of China (Taiwan)
99	Not known or other

* Nnemonic (abbreviation) used in computer

TABLE F-3 (Continued)

(3)	Ship No.: (NMBR)	A three digit number between 001 and 999 assigned for identification of ships
(4)	Type of Ship: (TYPE)	1. Tanker < 100,000 DWT 2. Tanker > 100,000 DWT 3. Bulk Carrier < 100,000 DWT 4. Bulk Carrier > 100,000 DWT 5. Cargo ship 6. Container ship 7. LNG ship 8. Passenger ship 9. Others (drilling, etc.)
(5)	Disp.: (DISP)	Trial Displacement (1000 metric tons) 1 metric ton = .984 long tons {multiply displ (in l.tons) by 1.016 to obtain displ in metric tons Use trial displacement if known otherwise use design full load summer displacement Fully loaded and ballasted ship data should be considered as two distinct ships.
(6)	LBP: (LBPX)	Ship length between perpendiculars (meters)
(7)	LOA: (LOAX)	Ship's overall length (meters)
(8)	Beam: (BEAM)	Maximum beam (meters)
(9)	Draft: (DRFT)	Draft at midships, or mean draft (meters)
(10)	Trim: (TRIM)	Trim of ship (% of mean draft) + trim by stern - trim by bow
(11)	Bulb: (BULB) 39-42	Bulbous bow area forward of forward perpendicular, divided by ship LBP times draft (% length × draft)
(12)	Design Disp. (DDIS)	Ship displacement at design load (1000 metric tons)
(13)	Service SHP: (SSHP)	Engine SHP at service speed (1000 HP) Use maximum SHP if service SHP is unknown
(14)	Service RPM: (SRPM)	Engine RPM at service speed (RPM) Use maximum rpm if service RPM is unknown

TABLE F3 (Continued)

(B) Rudder, Propulsion and Wind/Wave Subrecord

(15) Data Code: See item (1)

(16) Service Speed: (SSPD) Design Service Speed (knots)

(17) Rudder Area: (RDAR) Total (fixed plus movable) rudder area (meters^2) If ship has multiple rudders, use total area

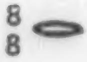
(18) Prop. Diam.: (PDIA) Propeller Diameter (meters)

(19) Astern SHP: (ASHP) Maximum SHP when ship is moving astern (1000 HP)

(20) Rudder/Stern Code: (RDST)
1. All-movable rudder
2. Semi-balanced rudder
3. Balanced rudder with fixed structure
4. All-movable rudder with flap
5. Cruiser rudder

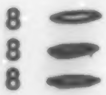
(21) Engine Code: (ENGN) Type of propulsion engine
1. Steam with fixed pitch propeller
2. Steam with controllable pitch propeller
3. Diesel with fixed pitch propeller
4. Diesel with controllable pitch propeller
5. Gas turbine with fixed pitch propeller
6. Gas turbine with controllable pitch propeller

9. Other

(22) Prop/Rudder Code: Propeller/rudder arrangement
1. One propeller, one rudder
2. One propeller, two rudders
3. Two propellers, one rudder : 

4. Two propellers, two rudders

5. Multiple propellers with equal number of rudders

e.g., 

6. Multiple propellers with unequal number of rudders,

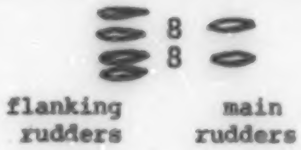
e.g., 

TABLE F-3 (Continued)

(23) Lateral Wind Area: (LATA)	Lateral projected area (above still waterline) (100 meters^2)
(24) Wind LCA: (LCAX)	Center of lateral projected area (above still waterline) measured from midships, + forward, - aft of midships (meters)

(25) Wind/Wave Code:

(WNWV)

	Wind	Beaufort Scale	Speed (Knots)	Wave	Height (ft)
1	Calm	0-3	0-11	Smooth	0-3
2	Calm			Moderate	4-6
3	Calm			High	6-Up
4	Moderate	4-6	12-27	Smooth	0-3
5	Moderate			Moderate	4-6
6	Moderate			High	6-Up
7	Strong	7-12	28-Up	Smooth	0-3
8	Strong			Moderate	4-6
9	Strong			High	6-Up

(26) Trial Code:
CC39,40
(TRLC)

1. Ship trials conducted by ship officer/ ship company
2. Ship trials conducted by shipyard
3. Ship trials were very carefully conducted
4. Simulation results
5. Model tests

(C) Turning circle subrecord

(27) Data Code:	See item (1)
(28) Approach Speed: (SPDT)	Speed at start of turn (knots)
(29) Final Speed:	Speed at 180° turn, or final steady state speed (knots)
(30) Rudder Angle: (RUDT)	Commanded rudder angle (degrees) Positive for port rudder Negative for starboard rudder
(31) Advance: (ADVT)	Head reach of ship's C.G. at 90° turn (100 meters)
(32) Transfer: (TRNT	Side reach of ship's C.G. at 90° turn (100 meters)

[redacted]

TABLE F-3 (Continued)

(33) Tactical Diam: (DIAT)	Side reach of ship's C.G. at 180° turn (100 meters)
(34) Final RPM: (FRPM)	RPM at finish of turn
(D) Stopping Subrecord	
(35) Data Code:	See item (1)
(36) Approach Speed: (SPDS)	Speed at start of stopping command (knots)
(37) Percent Astern SHP: (SHPS)	Percent of maximum astern SHP ordered
(38) Rudder Command: (RUDS)	0 = Zero rudder ±1 - ±49 = commanded rudder angle, (degrees) no rudder cycling ±50 - ±98 = 49 + commanded maximum rudder angle (degrees) with rudder cycling ±99 = unknown or not specified, but rudder direction can be derived.
(39) Track Distance: (TDIS)	Stopping tract distance of ship's C.G. (100 meters)
(40) Head Reach: (HRCH)	Head reach of ship's C.G. at stop (100 meters)
(41) Side Reach: (SRCH)	Side reach of ship's C.G. at stop (100 meters)
(42) Time to Stop: (TIMS)	Time elapsed between the start of stopping maneuver and ship forward speed = 0 (minutes)
(43) Time to RPM = 0: (TIMR)	Time elapsed between the start of stopping maneuver and shaft RPM = 0 (seconds)
(E) Zig-Zag Subrecord	
(44) Data Code	See item (1)
(45) Approach Speed: (SPDZ)	Speed at start of zig-zag (knots)
(46) Rudder Angle: (RUDZ)	Commanded rudder angle (degrees)
(47) First Overshoot: (OVS1)	First overshoot angle (degrees)
(48) Final Overshoot: (OVSF)	Last available zig-zag overshoot angle (degrees)
(49) Overshoot Width:	Overshoot width of path, the side reach measured from 2nd rudder command to first maximum side reach (100 meters)

[redacted]

TABLE F-3 (Concluded)

(50) K' : (KPRM)	Nondimensionalized Motoro/Norrbin zig-zag parameter (see Appendix
(51) T' : (TPRM)	Nondimensionalized Motoro/Norrbin zig-zag parameters (see Appendix
(52) Period: (PERD)	Time elapsed between 2nd rudder execution and 4th rudder execution (minutes)

F-3 Users Guides

Programs SMDB, SMPLT and STAT have been designed for easy use and hence elaborate user instructions or User's Guides are not needed. Sections D.3.1, b.3.2 and D.3.3 contains the User's Guides for these three programs.

F-3-1 Program SMDB

---------------------- USERS GUIDE TO SMDB PROGRAM ------------------------

PURPOSE

SMDB IS A COMPUTER PROGRAM DESIGNED TO ACCESS A FILE OF SHIP MANUVERABILITY DATA(SMDB.DAT) AND TO SELECT SHIPS BY CERTAIN CRITERIA. THE DATA FOR THESE SHIPS CAN BE LISTED OR THEY CAN BE FILED AWAY FOR FURTHER STUDY OR MANIPULATION.

SOFTWARE

SMDB WAS WRITTEN IN FORTRAN AND RUNS UNDER DIGITAL EQUIPMENT CORPORATION'S RSX-11M OPERATING SYSTEM.

FILES

SMDB.DAT
IS THE SHIP MANUVERABILITY DATA FILE. IT IS ORGANIZED INTO SHIP RECORDS. EACH RECORD HAS 3 TO 5 SUBRECORD TYPES. THESE 5 ARE:

1 - SHIP DIMENSIONS
2 - RUDDER, PROPELLER AND OTHER SHIP CHARACTERISTICS
3 - TURNING CIRCLE DATA
4 - STOPPING DATA
5 - ZIG-ZAG DATA

THERE MUST BE ONE EACH OF SUBRECORD TYPES 1 AND 2 FOR EACH SHIP AND THERE MAY BE ZERO, ONE OR MORE OF EACH OF SUBRECORD TYPES 3, 4 AND 5 FOR EACH SHIP. THE MAXIMUM NUMBER OF SUBRECORDS ALLOWED FOR A SHIP IS 50. THE MAXIMUM NUMBER OF SHIPS ALLOWED IN SMDB.DAT IS 100.

SMDB.DAT IS A DIRECT ACCESS FILE WITH FIXED LENGTH RECORDS AND THUS CANNOT BE EDITED. TO UPDATE OR ADD TO THIS FILE ONE MUST USE THE EDITOR ON DABA.DAT AND THEN RUN A PROGRAM - CHDB TO CREATE A NEW SMDB.DAT FILE. SEE GUIDE TO CHDB.

SMDD.DAT
IS A DATA DICTIONARY FOR THE VARIABLES STORED IN SMDB.DAT. INFORMATION IS STORED ONE RECORD PER VARIABLE AND INCLUDES:

1 - A 4 CHARACTER MNEMONIC FOR THE VARIABLE
2 - A CODE DEPICTING VARIABLES AS:
    1 - QUANTITATIVE
    2 - QUALITATIVE ITEM
3 - DESCRIPTION OF THE VARIABLE
4 - UNIT OF MEASUREMENT (IF APPLICABLE)
5 - MINIMUM ALLOWABLE VALUE
6 - MAXIMUM ALLOWABLE VALUE

SMDD.DAT CAN BE CHANGED BY USING THE TEXT EDITOR.

SMDB EXECUTION

TO RUN SMDB ENTER: (USER ENTRIES UNDERLINED)

```
>RUN SMDB
 --------
```

A MESSAGE IS DISPLAYED:

```
SHIP MANUVERABILITY DATA BASE PROGRAM

ENTER DATA ITEM(S) FOR HIGH SPEED SCANNING
```

NOTE:

ANY 10 DATA ITEMS FROM SUBRECORD TYPES 1 AND 2 CAN BE STORED INTERNALLY FOR HIGH SPEED SCANNING.(SEE SELECT MODE) IF SCANNING IS TO BE DONE FOR ANY ITEMS NOT STORED INTERNALLY

[redacted]

NOTE:

ANY 10 DATA ITEMS FROM SUBRECORD TYPES 1 AND 2 CAN BE STORED INTERNALLY FOR HIGH SPEED SCANNING.(SEE SELECT MODE) IF SCANNING IS TO BE DONE FOR ANYITEMS NOT STORED INTERNALLY THE SCAN OF SHIPS MUST GO TO THE DISK AND WILL TAKE UP TO ONE MINUTE. OTHERWISE THE SCAN IS ALMOST INSTANTANEOUS.

TEN ITEMS ARE DEFAULT FOR INTERNAL STORAGE. THEIR MNEMONICS ARE:

- TYPE
- DISP
- LBPX
- BEAM
- DRFT
- RDAR
- PDIA
- PROP
- WNWV
- NMBR

TO CHANGE THIS LIST ENTER THE MNEMONICS(TAKEN FROM THE DATA DICTIONARY) FOR THE VARIABLES YOU ARE INTERESTED IN. ENTER ON ONE LINE WITH A SPACE BETWEEN EACH. THE ITEMS YOU ENTER REPLACE THE ITEMS ON THE ABOVE LIST FROM THE BOTTOM UP.

EXAMPLE:

```
        TRIM BULB ENGN
        --------------
```

THE FILE IS THEN READ PLACING THE HIGH SPEED SCANNING VARIABLES IN INTERNAL STORAGE.

WHEN FINISHED A MESSAGE IS DISPLAYED:

```
      XXX SHIPS ON FILE       [WHERE XXX IS THE NUMBER OF SHIP RECORDS]
```

THEN THE COMPUTER DISPLAYS:

```
      TYPE 'HELP' FOR A LIST OF OPTIONS
```

AND A PROMPT:

```
      MNV>
```

AT THIS POINT YOU MAY ENTER ONE OF THE OPTIONS LISTED BELOW. IF YOU RESPOND:

```
      MNV>HELP
          ----
```

YOU WILL GET A LIST OF OPTIONS:

```
      VALID OPTIONS:  CHECK
                      LIST
                      SELECT
                      HELP
                      DDICT
                      SORT
                      EXIT
```

AND THE PROMPT:

```
      MNV>
```

ENTER ANY VALID OPTION. WHEN THE OPTION IS COMPLETE AN MNV> PROMPT FOR ANOTHER OPTION WILL BE PROVIDED.

[redacted]

YOU WILL GET A LIST OF OPTIONS:

```
VALID OPTIONS:  CHECK
                LIST
                SELECT
                HELP
                DDICT
                SORT
                EXIT
```

AND THE PROMPT:

```
MNV>
```

ENTER ANY VALID OPTION. WHEN THE OPTION IS COMPLETE AN MNV> PROMPT FOR ANOTHER OPTION WILL BE PROVIDED.

==

DESCRIPTION OF SMDB OPTIONS

CHECK

THIS OPTION WILL SCAN THE FILE AND CHECK TO MAKE SURE ALL ITEMS ARE WITHIN THE LIMITS SET IN THE DATA DICTIONARY. IF EVERYTHING CHECKS OUT AFTER 1-2 MINUTES THE COMPUTER TYPES:

```
NO ERRORS FOUND
```

LIST

THIS OPTION WILL MAKE A COMPLETE LISTING WITH HEADINGS OF THE DATA BASE.

SELECT

THIS WILL PUT YOU INTO SELECT MODE. (SEE BELOW)

HELP

DISPLAYS VALID SMDB OPTIONS TO THE MNV> PROMPT.

DDICT

MAKES A COMPLETE LISTING OF THE DATA DICTIONARY.

SORT

WILL SORT THE SUBRECORDS IN EACH SHIP SO THAT THEY ARE IN ASCENDING ORDER BY SUBRECORD TYPE 1-5.

BEST DOCUMENT AVAILABLE

SELECT MODE

WHEN SELECT IS ENTERED IN RESPONSE TO THE MNV> PROMPT YOU GO INTO ANOTHER MODE WITH A NEW SET OF OPTIONS. THE FIRST MESSAGE HERE IS:

```
SELECT MODE
```

AND A PROMPT:

```
SEL>
```

IF YOU ENTER:

```
SEL>HELP
    ----
```

YOU GET:

```
VALID OPTIONS:  FIND
                SHOW
                LIST
                HELP
                FILE
                QUIT
                EXIT
```

AND THE PROMPT:

```
SEL>
```

ENTER ANY VALID OPTION.

DESCRIPTION OF SELECT OPTIONS

FIND

THIS COMMAND INITIATES THE SCAN OF THE DATA BASE FOR SHIPS THAT MEET THE SPECIFIED CRITERIA. THE FORM OF THE 'FIND' COMMAND IS:

```
FIND MNEM OP LM1 [LM2] [AND]    <-BRACKETS SIGNIFY OPTIONAL ENTRY-

WHERE:        MNEM    IS ONE OF THE VALID 4 CHARACTER MNEMONICS
              OP      IS A 2 CHARACTER OPERATOR OF WHICH THERE ARE FIVE:
                              GT - GREATER THAN
                              LT - LESS THAN
                              EQ - EQUAL TO  .
                              BT - BETWEEN LM1 AND LM2
                              NE - NOT EQUAL TO LM1
              LM1     IS A LIMIT THAT EACH SHIP IS COMPARED TO WITH THE
                      OPERATOR SELECTED. WITH THE BT OPERATOR IT IS THE
                      LOWER LIMIT. MUST BE ENTERED WITH A DECIMAL POINT.
              LM2     IS ONLY USED WITH THE BT OPERATOR AS THE UPPER LIMIT.
                      MUST BE ENTERED WITH A DECIMAL POINT.
              AND     WITH 'AND' APPENDED TO THE 'FIND' COMMAND YOU MAY
                      ADD ANOTHER 'FIND' COMMAND TO THE SAME SCAN OF THE DATA
                      BASE. WHEN AN 'AND' IS ENTERED A FND> PROMPT IS DISPLAYED
                      ON THE NEXT LINE AND ANOTHER 'FIND' MUST BE ENTERED.
```

EXAMPLE: TO FIND ALL SHIPS WITH A DISPLACEMENT BETWEEN 100,000 AND 150,000 TONS. (VALUES OF 100. AND 150. IN DATA BASE)

```
SEL>FIND DISP BT 100. 150.
    ----------------------
```

THE NUMBER OF SHIPS MEETING THIS CRITERIA IS DISPLAYED:

```
244 SHIPS FOUND
```

MUST BE ENTERED WITH A DECIMAL POINT.

AND WITH 'AND' APPENDED TO THE 'FIND' COMMAND YOU MAY ADD ANOTHER 'FIND' COMMAND TO THE SAME SCAN OF THE DATA BASE. WHEN AN 'AND' IS ENTERED A FND> PROMPT IS DISPLAYED ON THE NEXT LINE AND ANOTHER 'FIND' MUST BE ENTERED.

EXAMPLE: TO FIND ALL SHIPS WITH A DISPLACEMENT BETWEEN 100,000 AND 150,000 TONS. (VALUES OF 100. AND 150. IN DATA BASE)

```
        SEL>FIND DISP BT 100. 150.
            ----------------------
```

THE NUMBER OF SHIPS MEETING THIS CRITERIA IS DISPLAYED:

```
        244 SHIPS FOUND
```

EXAMPLE: FIND ALL SHIPS WITH A DRAFT LESS THAN 10 METERS AND WITH A RUDDER TYPE 2.

```
        SEL>FIND DRFT LT 10. AND
            --------------------
                FND>FIND RUDT EQ 2.
            ---------------

        22 SHIPS FOUND.
```

WHEN THE FIND COMMAND IS EXECUTED A LIST OF SHIPS SELECTED IS STORED. EACH 'FIND' WILL CREATE A NEW LIST AND THE OLD LIST WILL BE LOST. TO SAVE THE OLD LIST USE THE 'FILE' COMMAND(SEE BELOW).

SHOW

LIST SHIPS (BY THEIR POSITION IN FILE) FOUND BY PREVIOUS 'FIND' COMMAND.

LIST

MAKE A COMPLETE LISTING WITH HEADINGS OF SHIPS FOUND BY PREVIOUS 'FIND' COMMAND.

HELP

LIST VALID OPTIONS TO SEL> PROMPT.

FILE

PLACE IN A NEW, SEPARATE FILE SHIPS FOUND WITH PREVIOUS 'FIND' COMMANDS. A FILE NAME IS PROMPTED FOR.

QUIT

QUIT SELECT MODE AND RETURN TO SHDB FOR MNV> PROMPT. FOR ADDITIONAL SHDB OPTION.

EXIT

EXIT SHDB.

[redacted]

SMDB.DAT DESCRIPTION AND MAINTENANCE

FILE STRUCTURE-

SMDB.DAT IS ORGANIZED INTO SHIP RECORDS, EACH SHIP HAVING 2 OR MORE 80 CHARACTER SUB-RECORDS. THERE ARE 5 TYPES OF SUB-RECORDS. EACH RECORD CONSISTS OF A SUB-RECORD TYPE CODE (NUMBER FROM 1 - 5) RIGHT JUSTIFIED IN COLUMNS 1 & 2 AND DATA ITEMS IN COLUMNS 3 - 80 WITH A FORMAT 13F6.1. IF A SUB-RECORD DOES NOT HAVE 13 DATA ITEMS THE REMAINING FIELDS CONTAIN 0.0.

THE END OF FILE IS INDICATED BY THE NUMBER 99 IN COLUMNS 1 & 2.

DESCRIPTION OF SUB-RECORDS-

TYPE 1, SHIP DESCRIPTION 1: THERE MUST BE ONE OF THESE FOR EACH SHIP

'1' - RECORD TYPE CODE
NATN - SHIP NATIONALITY
NMBR - SHIP NUMBER
TYPE - TYPE OF SHIP CODE
DISP - TRIAL DISPLACEMENT
LBPX - LENGTH BETWEEN PERPENDICULARS
LOAX - LENGTH OVERALL
BEAM - SHIP'S BEAM
DRFT - SHIP'S DRAFT AT TRIALS
TRIM - SHIP'S TRIM
BULB - BULBOUS BOW AREA FWD OF F.P.
DDIS - DESIGN DISPLACEMENT
SSHP - SERVICE SHP
SRPM - SERVICE RPM

TYPE 2, SHIP DESCRIPTION 2: THERE MUST BE ONE OF THESE FOR EACH SHIP

'2' - RECORD TYPE CODE
SSPD - SERVICE SPEED
RDAR - TOTAL RUDDER AREA
PDIA - PROPELLER DIAMETER
ASHP - MAX ASTERN SHP
RDST - RUDDER/STERN CODE
ENGN - ENGINE CODE
PROP - PROPELLER/RUDDER CODE
LATA - LATERAL AREA
LCAX - WIND LATERAL CENTER OF AREA
WNWV - WIND/WAVE CODE
TRLC - TRIAL CODE

TYPE 3, TURNING MANUVER THERE MAY BE ZERO OR MORE OF THESE

SPDT - SPEED AT START OF TURNING
SPDF - SPEED AT STEADY TURNING
RUDT - RUDDER ANGLE AT TURNING
ADVT - ADVANCE OF TURN
TRNT - TRANSFER OF TURN
DIAT - TACTICAL DIAMETER OF TURN
FRPM - RPM AT FINISH OF TURN

TYPE 4. STOPPING MANUVER THERE MAY BE ZERO OR MORE OF THESE

SPDS - SPEED AT START OF STOPPING
SHPS - ASTERN SHP RECOMMENDED FOR STOP
RUDS - RUDDER COMMAND AT STOPPING
TDIS - TRACK DISTANCE OF STOPPING
HRCH - HEAD REACH AT STOP
SRCH - SIDE REACH AT STOP
TIMS - TIME TO STOP
TIMR - TIME TO RPM=0

TYPE 5, ZIG-ZAG MANUVER: THERE MAY BE ZERO OR MORE OF THESE

SPDZ - SPEED AT START OF ZIG-ZAG
RUDZ - COMMANDED RUDDER ANGLE
OVS1 - FIRST OVERSHOOT
OVS2 - SECOND OVERSHOOT
OVSW - OVERSHOOT WIDTH
KPRM - ZIG-ZAG PARAMETER
TPRM - ZIG-ZAG PARAMETER
PERD - PERIOD OF ZIG-ZAG

ADDING TO AND ALTERING SMDB.DAT-

SMDB.DAT HAS THE FOLLOWING ATTRIBUTES:
DIRECT (OR RANDOM) ACCESS
FIXED LENGTH RECORDS
80 CHARACTER RECORDS

THIS FILE NEEDS FIXED LENGTH RECORDS IN ORDER TO BE A RANDOM ACCESS FILE, AND IT NEEDS RANDOM ACCESS TO AVOID HAVING TO SCAN THE ENTIRE FILE TO SELECT A SHIP.

SINCE SMDB.DAT HAS FIXED LENGTH RECORDS ONE CANNOT EDIT THE FILE. THE PROCEDURE FOR MAKING ANY CHANGES TO THE FILE INVOLVE EDITING ANOTHER FILE AND RUNNING A PROGRAM TO CREATE A NEW SMDB.DAT.

THE EDITABLE FILE IS CALLED SMDABA.DAT. THE STRUCTURE IS THE SAME AS SMDB.DAT IN THAT EACH LINE OF SMDABA.DAT CORRESPONDS TO A SHIP SUB-RECORD. SMDABA.DAT DIFFERS BECAUSE IT HAS VARIABLE LENGTH RECORDS THAT CAN BE READ WITH FREE FORMAT (LIST-DIRECTED) FORTRAN READ STATEMENTS. THE ITEMS IN EACH RECORD ARE SEPARATED BY A TAB (A SPACE OR A COMMA ALSO WORK) AND EACH RECORD IS TERMINATED BY A SLASH '/'.

YOU MAY EDIT SMDABA.DAT WITH DEC'S STANDARD EDITOR--INSERTIONS, DELETIONS AND SUBSTITUTIONS CAN ALL BE USED. EACH RECORD MUST BEGIN WITH A RECORD TYPE (AN INTEGER FROM 1 TO 5) AND MUST END WITH A SLASH. THE FINAL RECORD IN THE FILE MUST HAVE A RECORD TYPE NUMBER OF 99 TO INDICATE END-OF-FILE.

AFTER EDITING SMDABA.DAT CREATE A NEW SMDB.DAT BY ENTERING:

```
RUN NEWDB
---------
```

WHEN FINISHED IT IS A GOOD IDEA TO PURGE AND THEN MAKE BACKUP COPIES OF BOTH SMDABA.DAT AND SMDB.DAT.

F-3-2 **Program SMPLT** [redacted]

-------------------- USERS GUIDE TO SMPLT ----------------------------

PURPOSE

THE PROGRAM SMPLT CREATES PLOTTING FILES OF SHIP MANUVERABILITY DATA FOR INPUT TO PLOT5 - TEKTRONIX'S 'EASY GRAPH' PACKAGE. THIS DATA COMES FROM A FILE CREATED BY THE PROGRAM SMDB.

SOFTWARE

SMPLT WAS WRITTEN IN FORTRAN AND RUNS UNDER DIGITAL EQUIPMENT CORPORATION'S RSX-11M OPERATING SYSTEM.

FILES

INPUT.DAT
IS A FILE CREATED BY A PREVIOUS RUN OF SMDB. IT HAS THE EXACT SAME STRUCTURE AS THE MAIN DATA BASE FILE - SMDB.DAT - AND IS IN FACT A SUBSET OF THAT FILE. SEE GUIDE TO SMDB.

SMDD.DAT
IS THE SAME DATA DICTIONARY FILE USED IN THE SMDB PROGRAM. SEE GUIDE TO SMDB.

SMPLT EXECUTION

TO EXECUTE SMPLT ENTER: [USER ENTRIES UNDERLINED]

```
>RUN SMPLT
 ---------
```

A MESSAGE IS DISPLAYED:

```
ENTER INPUT FILE NAME
```

ENTER NAME OF FILE FROM WHICH YOU WISH GRAPHS TO BE PLOTTED. THIS FILE HAS BEEN CREATED BY THE SMDB PROGRAM AND SHOULD BE ON DIRECTORY [201,2].

THE FILE IS READ THROUGH TO MAKE AN INDEX TO EACH SHIP RECORD AND THEN ANOTHER MESSAGE IS DISPLAYED:

```
ENTER UP TO 10 VARIABLES FOR EASY GRAPH.
8 VARIABLES IN 1ST LINE.
```

.AT THIS POINT ENTER ANY OF THE MNEMONICS FOUND IN THE DATA DICTIONARY LIST. USE A SPACE BETWEEN EACH. IF ENTERING MORE THAN 8 VARIABLES HIT RETURN AFTER 1ST 8 AND THEN ENTER UP TO 2 MORE ON 2ND LINE AND HIT RETURN.

NOTE(

SINCE THERE MUST BE A ONE TO ONE CORRESPONDENCE FOR ALL VARIABLES TO BE PLOTTED THERE CAN BE NO MIXING OF DIFFERENT TYPES OF MANUVERABILITY DATA. FOR EXAMPLE, YOU CANNOT PLOT A TURNING MANUVER VARIABLE AGAINST A ZIG-ZAG MANUVER VARIABLE. ONLY ONE OF THE TURNING, STOPPING OR ZIG-ZAG SUBRECORD TYPES MAY HAVE VARIABLES SELECTED FROM THEM AT ON TIME.

SMPLT NOW SCANS THE FILE, READING THE REQUESTED VARIABLES INTO MEMORY. ANY SHIP WITH A MISSING VALUE FOR ONE OF THE VARIABLES IS DROPPED.

WHEN FINISHED THIS PROCESS THE FOLLOWING INFORMATION IS PROVIDED:

M PLOT FILES CREATED.
N DATA POINTS PER FILE.

WHERE: M IS THE NUMBER OF VARIABLES ENTERED. (ONE FILE PER VARIABLE)
N IS THE NUMBER OF DATA POINTS FOUND ON THE INPUT FILE.

NOTE:

THERE CAN BE MORE THAN 1 DATA POINT PER SHIP IF PLOTTING IS DESIRED FOR MANUVERABILITY DATA. FOR EXAMPLE, IF A SHIP HAS SEVEN TURNING SUBRECORDS AND TACTICAL DIAMETER IS SELECTED FOR PLOTTING AGAINST DISPLACEMENT YOU WILL GET SEVEN DIFFERENT DIAMETERS PLOTTED AGAINST ONE DISPLACEMENT VALUE.

THESE FILES ARE CREATED ON DIRECTORY [201,2] AND ARE GIVEN THE SAME 4 CHARACTER NAME AS THEIR MNEMONIC WITH A 'DAT' EXTENSION APPENDED. THE VARIABLES ARE THEN ACCESSED IN PLOTS WITH THE 'ATTACH' COMMAND. SEE THE 'EASY GRAPH' MANUAL.

WARNING:

THE MAXIMUM NUMBER OF DATA POINTS ALLOWED PER FILE IS 500. AN ERROR MESSAGE IS DISPLAYED IF MORE THAN 500 ARE FOUND DURING THE FILE SCAN.

F-3-3 Program STAT

[redacted]

-------------------- USERS GUIDE TO STAT ----------------------------

PURPOSE

THE PROGRAM STAT COMBINES A SERIES OF SUBROUTINES TO PERFORM LEAST SQUARE CURVE FIT FOR PARAMETERS SELECTED BY PROGRAM SMPLT. IT ALSO CHANGES, DELETES, AND LISTS DATA POINTS FOR THE CURVE FIT. AND STORES DATA FOR INPUT TO PLOT5 - TEKTRONIX'S 'EASY GRAPH' PACKGE.

SOFTWARE

STAT WAS WRITTEN IN FORTRAN AND RUNS UNDER DIGITAL EQUIPMENT CORPORATION'S RSX-11M OPERATING SYSTEM.

FILES

PARA.DAT
IS A FILE CREATED FOR THE X, Y FUNCTION DEFINITIONS. IT HAS 4 CHARACTERS PER LINE. EACH LINE OF THE FILE SHOULD CONTAIN A MNEMONICS OF THE SHIP DATA PARAMETERS, OR 4 BLANK SPACES(TO SEPERATE PARAMETER SETS).

SMDD.DAT
IS THE SAME DATA DICTIONARY FILE USED IN THE SMDB PROGRAM. SEE GUIDE TO SMDB.

PREPROCESSING

BEFORE EXECUTING STAT, PROGRAM SMPLT SHOULD BE EXECUTED TO CREATE INPUT FILES FOR THE SELECTED PARAMETERS. THE NAMES OF THE FILES ARE THE SAME AS THE PARAMETER MNEMONICS IN SMDD.DAT. FOR EXAMPLE:

> THE USER WANTS TO CREATE A FILE FOR DISPLACEMENT DISP, THE FILE NAME FOR THIS PARAMETER IS
>
> DISP.DAT

TWO ADDITIONAL THINGS SHOULD BE DONE BEFORE EXECUTING STAT:

(I) CHECK THE FILE PARA.DAT
THE USER NEEDS TO INCLUDE THE DESIRED PARAMETERS FOR A PARTICULAR ANALYSIS IN PARA.DAT. FOR EXAMPLE:

THE USER WANTS TO CURVE FIT LBPX VS DISP, PARA.DAT SHOULD INCLUDE:

```
----  (OTHER SET OF PARAMETERS)
----

DISP
LBPX

----  (OTHER SET OF PARAMETERS)
----
```

NOTE THAT THE LAST LINE OF PARA.DAT MUST BE 4 BLANK SPACES.

IF PARA.DAT DOES NOT INCLUDE THE DESIRED SET OF PARAMETERS, A NEW SET OF PARAMETER MNEMONICS MUST BE ENTERED USING EDITOR.

(II) DEFINE X, Y FUNCTIONS
THE LEAST SQUARE CURVE FIT PROGRAMS CAN ONLY BE OPERATED ON TWO VARIABLES

AT A TIME. THEREFORE THE PARAMETERS MUST BE MANIPULATED TO GIVE ONLY TWO VARIABLES X, AND Y. THESE FUNCTIONS MUST BE DEFINED IN SUBROUTINE XYCAL(FILE XYCAL.FTN) BEFORE EXECUTING STAT. THERE ARE UP TO 10 X, Y FUNCTIONS CAN BE DEFINED IN XYCAL.

THE PARAMETER NAMES IN XYCAL ARE NO LONGER THE MNEMONICS USED IN PARA.DAT FILE. THEY ARE FIT(I,J), WHERE J IS NUMBERED ACCORDING TO THE ORDER OF THE PARAMETERS STORED IN PARA.DAT. FOR EXAMPLE:

IN THE PREVIOUS EXAMPLE

```
FIT(I,1) CORRESPONDS TO DISP
FIT(I,2) CORRESPONDS TO LBPX
```

IF IT IS DESIRED TO CURVE FIT LBP IN METERS VS DISPLACEMENT IN TONS. THEN THE PROGRAM XYCAL SHOULD BE ALTERED AS:

```
STATMENT NO.     X(I)=FIT(I,1)*1000.
                 Y(I)=FIT(I,2)
                 GO TO 200
```

BE SURE TO COMPILE XYCAL AFTER DEFINING OR CHANGING X, Y FUNCTIONS.

STAT EXECUTION

IF XYCAL HAS BEEN MODIFIED, TASK BUILD STAT BY TYPING:

```
>@STAT
```

TO EXECUTE STAT AFTER TASK BUILDING, ENTER:

```
>RUN STAT
```

A MESSAGE IS DISPLYED:

```
SELECT ONE OF THE FOLLOWING OPTIONS:
            1  CHOOSE SHIP VARIABLES FOR X, Y FUNCTIONS
            2  LIST X, Y
            3  CHANGE VALUES OF X, Y ELEMENTS
            4  LEAST SQUARE CURVE FIT
            5  STORE X, Y, SHIP VARIABLES, AND/OR FITTED X, Y ON DISK
            6  EXIT
```

AFTER FINISHING AN OPTION, THE ABOVE PROCESS WILL REPEAT FOR THE USER TO SELECT NEXT OPTIONS. IF OPTION 6 IS SELECTED THE STAT PROGRAM WILL END. THE FUNCTIONS OF THESE OPTIONS ARE EXPLAINED BELOW:

<1> IF OPTION 1 IS SELECTED, THE PROGRAM WILL READ IN PARA.DAT, AND PRINT THE PARAMETER NAMES STORED IN THAT FILE. EACH SET OF PARAMETERS IS GIVEN A NUMBER FOR IDENTIFICATION. NOTE THAT THESE NAMES MUST BE THE MNEMONICS LISTED IN THE SMDD.DAT FILE. AND EACH SET CAN HAVE NO MORE THAN 10 PARAMETERS. THE PROGRAM THEN PROMPT:

```
SELECT ONE OF THE ABOVE PARAMETRIC COMBINATIONS
```

AFTER A NUMBER IS SELECTED, STAT WILL LIST THE PARAMETERS FOR THAT IDENTIFYING NUMBER. STAT WILL THEN INPUT THE DATA AND CALCULATE X, Y VARIABLES.

<2> IF OPTION 2 IS SELECTED, STAT WILL LIST THE VALUES OF THE X, Y VARIABLES. AT THE END OF EACH PAGE(10*12=120 DATA POINTS), THE USER SHOULD SELECT WHETHER TO CONTINUE LISTING OR NOT BY ENTERING "Y" OR "N" AFTER THE PROMPT:

```
CONTINUE LISTING?(Y/N)
```

AT THE END OF LISTING, THE USER SHOULD ENTER "1" TO PROCESS OTHER OPTIONS AFTER

THE PROMPT:

```
ENTER 1 TO PROCESS OTHER OPTIONS
```

<3> IF OPTION 3 IS SELECTED, STAT WILL PROMPT THE USER TO ENTER THE DATA NUMBER OF THE DATA TO BE CHANGED:

```
ENTER DATA # TO BE CHANGED
```

THEN IT WILL PRINT OLD VALUES:

```
OLD VALUES
#   # X= #.###E ##  Y= #.###E ##
WHERE #'S INDICATE VALUES IN THE X, Y ARRAYS
```

AND ASK FOR NEW VALUES:

```
ENTER NEW X, Y VALUES, OR
1.E 30, 1.E 30 TO DELETE THIS DATA POINT
```

THE USER CAN DELETE A DATA POINT BY ENTERING:

```
1.E+30, 1.E+30
```

STAT WILL ASK WHETHER MORE CHANGES ARE NEEDED AFTER EACH CHANGE OF DATA POINT:

```
MORE CHANGES?(Y/N)
```

NOTE THAT IF SOME DATA HAVE BEEN DELETED, OPTION 2 MUST BE RE-SELECTED IN ORDER TO COMPLETE THE DELETE PROCESS.

<4> IF OPTION 4 IS SELECTED, STAT WILL START LEAST SQUARE CURVE FIT. IT FIRST PROMPT FOR THE HIGHEST ORDER OF POLYNOMIAL APPROXIMATION:

```
ENTER HIGHEST ORDER OF APPROXIMATION DESIRED(MAX=7)
```

STAT WILL CURVE FIT DATA FOR ALL POLYNOMIALS WITH ORDERS FROM 1 UP TO THE HIGHEST ORDER SELECTED.
STAT THEN PROMPT:

```
DO YOU WANT FITTED CURVES PASS THE ORIGIN?(Y/N)
```

FOR CURVES PASSING THE ORIGIN(ENTER 'Y'), THE 0-TH ORDER TERM OF THE POLYNOMIAL IS 0.
STAT THEN CALCULATES AND PRINTS THE LEAST SQUARE FIT COEFFICIENTS, MEAN SQUARE ERROR, STANDARD DEVIATION, SLOPE, INTERSECTION, MEAN FROM FITTED CURVE, AND 20 INTERPOLATED VALUES FOR EACH CURVE. AT THE END OF OPTION 4, THE USER SHOULD ENTER '1' TO PROCESS OTHER OPTIONS AFTER THE PROMPT:

```
ENTER 1 TO PROCESS OTHER OPTIONS
```

<5> IF OPTION 5 IS SELECTED, DATA WILL BE STORED FOR FUTURE PROCESSING(E.G. FOR BL PLOTS INPUT), STAT WILL PROMPT WHETHER INTERPOLATED VALUES NEED TO BE STORED:

```
DO YOU WANT TO STORE THE INTERPOLATED POINTS?(Y/N)
```

IF YES(ENTER 'Y'), THEY ARE STORED IN:

```
RX.DAT
RY.DAT;I+J        WHERE I=1 TO THE HIGHEST ORDER DESIRED
                        J=THE LATEST VERSION NUMBER OF
                          RY.DAT PREVIOUSLY STORED
```

X, Y VARIABLES ARE STORED IN:

X.DAT [redacted]
Y.DAT

AND SHIP VARIABLES ARE STORED IN DATA FILES WITH THEIR CORRESPONDING MNEMONICS AS FILE NAMES.
AT THE END OF STORAGE, THE USER SHOULD ENTER '1' TO PROCESS OTHER OPTIONS AFTER THE PROMPT:

ENTER 1 TO PROCESS OTHER OPTIONS

<6> OPTION 6 ENDS STAT PROGRAM EXECUTION.

WARNING:

THE MAXIMUM NUMBER OF DATA POINTS ALLOWED PER FILE IS 500. AN ERROR MESSAGE IS DISPLAYED IF MORE THAN 500 ARE FOUND DURING THE FILE SCAN.

APPENDIX G

CALCULATION AND USE OF MANEUVERING PARAMETERS T AND K

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CALCULATION AND USE OF MANEUVERING PARAMETERS T AND K

G1 First-Order System Approximation of Ship Maneuvering Equations and Steering Quality Indices

Linear equations of ship maneuvering were at one time widely used, especially in Japan (see Reference A-1, for instance) and have proven quite useful in interpreting and predicting the steering behaviour of ships. It has been previously shown that the steering behaviour of a ship can be represented by the coupled sway-yaw equations with four characteristics coefficients, K, T_1, T_2, and T_3. The important parameters governing maneuverability are K and $T = T_1 + T_2 - T_3$. The equation of motion written in terms of the coefficients K and T can be expressed by the following differential equation of the first order in ship yaw rate, $r = \dot{\psi}$:

$$T \frac{d\dot{\psi}}{dt} + \dot{\psi} = K \delta_r \qquad (G\text{-}1)$$

where δ_r = rudder angle.

Comparing the above equation with the pure yaw motion equation

$$I_t \frac{d\dot{\psi}}{dt} + N_{\dot{\psi}} \dot{\psi} = N_{\delta r} \cdot \delta_r$$

It is easily understood that the index T represents a ratio of the inertia I_t to the damping coefficient $N_{\dot{\psi}}$, and the index K represents a ratio of the rudder turning moment coefficient $N_{\delta r}$ to damping coefficient $N_{\dot{\psi}}$, e.g.

$$T = \frac{\text{inertia of a ship}}{\text{yaw-damping coefficient}}$$

$$K = \frac{\text{turning moment coefficient}}{\text{yaw-damping coefficient}}$$

so that

$$K = \frac{\text{turning moment coefficient}}{\text{inertia of a ship}} \times T$$

It should be noted, however, that the yawing motion of a ship is coupled to swaying. Consequently, the inertia resisting yaw-acceleration is not merely a moment of inertia of the ship (included added inertia) but includes also a contributed due to sway mass. The same effects occur also for hull yaw damping moment and turning moment produced by the rudder.

Equation A-1 can be easily solved by numerical integration. For the most simple case where the rudder is put over suddenly to a certain angle δ_o, the solution is simply:

$$\dot{\psi} = K \delta_o (1-e^{-t/T})$$

The yaw rate $r = \dot{\psi}$ increases exponentially with a rate dependant on T and finally assumes a steady value $K \delta_o$. A larger K provides a tighter steady-state turning ability and a smaller T a quicker response to helm. Thus, K may be used as an index of turning ability and T as an index of quickness in response to helm.

It should be emphasized that the steady-state turning of a ship and how quickly a ship can reach steady state turning motion are two different maneuvering features, and that essentially these two features characterize response behaviour of a ship in steering. In summary, the main maneuvering qualities of ships can generally be characterized only by two indices, T and K, as indicated below.

T: represents quick responsiveness, or course stability

T	↑greater-quick responsiveness ↓smaller-course stability	↕	worse better

K: represents turning ability in accordance with the relation $K\delta = r$

K	↑greater ↓smaller	turning ability	↕	better worse

G.2 Methods for Obtaining Indices T and K

Ship motions during maneuvers are by no means linear and hence average values of K and T are naturally functions of the amplitude of motion. Therefore, the values of these indices vary significantly with the average magnitude of the motion. It is therefore important to estimate the values of both indices for the same conditions.

The indices T and K can be calculated numerically from Equation G-1 using known values of forces acting on the ship and rudder (obtained, for instance, from PMM tests and linearized to fit the format of Equation G-1). However, the advantage of these indices is that they can be easily derived from the results of the typical maneuvers conducted with actual or model ships.

G.2.1 Method for Obtaining T and K from a Turning Maneuver - In a turning maneuver, the rudder is put over as quickly as possible while the ship is advancing on a straight course and then is held at a fixed angle. After the turning of the ship reaches a steady-state phase, the rudder is returned to the mid-position as quickly as possible. From the record of the turning angle ψ and times during the above tests, T and K can be obtained from simple relationships, Reference G-2.

Usually a non-dimensional form of these indices is defined as follows:

$$T' = T\left(\frac{V}{L}\right) \qquad K' = \left(\frac{L}{V}\right)K$$

where V is velocity of center of gravity of a ship, and
L is ship length.

The steering quality indices K and T have an immediate relationship to the conventional measures of ship maneuverability, see Reference 1:

Turning diamet . $= 2/K'\delta_o$

Turning log $= T + t_1/2$ (t_1 = time to reach the rudder angle, δ_o)

Advance, D_A/L $= T' + 1/K'\delta_o + (V/L)\ t_1/2$

Considering the non-linear character of ship motions, different values of indices will be obtained for different applied rudder angles.

The coefficient K' can be easily obtained from the results of turning trials at variable rudder angles (spiral tests). The slope of the steady turning yaw rate plotted against rudder angle in a non-dimensional form (r'-δ_r characteristics) represents the ratio of the incremental r' to the incremental δ_r and this, in turn, equals $K' = K(L/V)$.

G.2.2 Method for Obtaining T and K From Zig-Zag Tests - Nomoto proposed a method for obtaining T and K from an analysis of the Kempf zig-zag test. This method is outlined in References G-1 and G-2. K and T can be calculated from Equation F-1 for different time intervals if there is a continuous record of the ship heading angle and rudder angle history. In the actual calculations,

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this process is repeated only for each set of changes in heading angles separately and the final values of K and T are obtained as an average of these values. Though this method of obtaining these indices is conceptually simple, the numerical process itself is tedious and is potentially inaccurate (the trials records of ship heading and rudder angles must be very precise).

Results of zig-zag tests, though valuable for a particular ship under specific test conditions, cannot be readily compared with results for other ships or other test conditions because of the highly transient character of the results. They also cannot be readily compared with results of tests performed at the different environmental condition. Because of the severe non-linearity for unstable ships, the values of K and T obtained for these ships should be extremely sensitive to the amplitude of motions.

The overshoot angle which is obtained from zig-zag tests has often been used as a measure of controllability. This angle is the difference between the heading angle when the rudder reverses and the subsequent extreme value of heading angle. As a result, however, a lower rudder rate yields a larger overshoot. In order to separate the effect of rudder rate (performance of the steering gear, rather than the ship), Japanese studies modified the definition so as to measure the angle from the time when a rudder passes amidship to the point of extreme course deviation. It should be noted that overshoot angle corresponds to KT $\delta_r/2$, and thus, the overshoot angle as a measure of maneuverability contains a drawback in that it cannot discrimate between a ship with good turning ability and quick response (large K and small T) and another with poor turning ability and slow response (smaller K and larger T); the former is much better than latter with respect to maneuverability.

Another measure of maneuverability which can be immediately obtained from zig-zag trial results is the lag time from the rudder passing amidship to the extreme heading deviation. The value of T can be determined from this lag time.

Estimations of the values of T and K show that there is a certain narrow range for the combination of T and K values. Nomoto suggested that the rudder area (A_R) and displacement (Δ) are the dominant factors governing the ratio K/T.

This is illustrated in Figure -1 in which 1/T', which represents the course stability or rate of response, is taken as an abscissa and $\frac{L\ A_R}{K'\ D}$, which represents a measure of turning ability is taken as an ordinate. As can be seen, the plotted values derived from numerous zig-zag trial tests are distributed within a relatively small range about a straight line through the origin. Taking into account the variety of ship and rudder configurations and the reliability of trial tests, this result is considered to confirm the validity of a correlation between K and T.

Figure G-1 also yields the following conclusions:

1. The turning ability and quick response to steering are related largely through rudder size.
2. The only effective way to improve the turning performance is generally to increase rudder size.

G.3 References

G.1 Researches on the Maneuverability of Ships in Japan, 60th Anniversary Series, Society of Naval Architects of Japan, Vol. 11, Tokyo, 1966.

G.2 Motoro, S., "Proposed Maneuverability Indices as a Measure of the Steering Qualities of Ships," 9th IPPC.

G.3 Maneuverability Committee, "Report of the Maneuverability Committee," Proceedings of the Twelfth International Towing Tank Conference, Rome, 1969.

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